

# Midwest Engineer

SERVING THE ENGINEERING PROFESSION



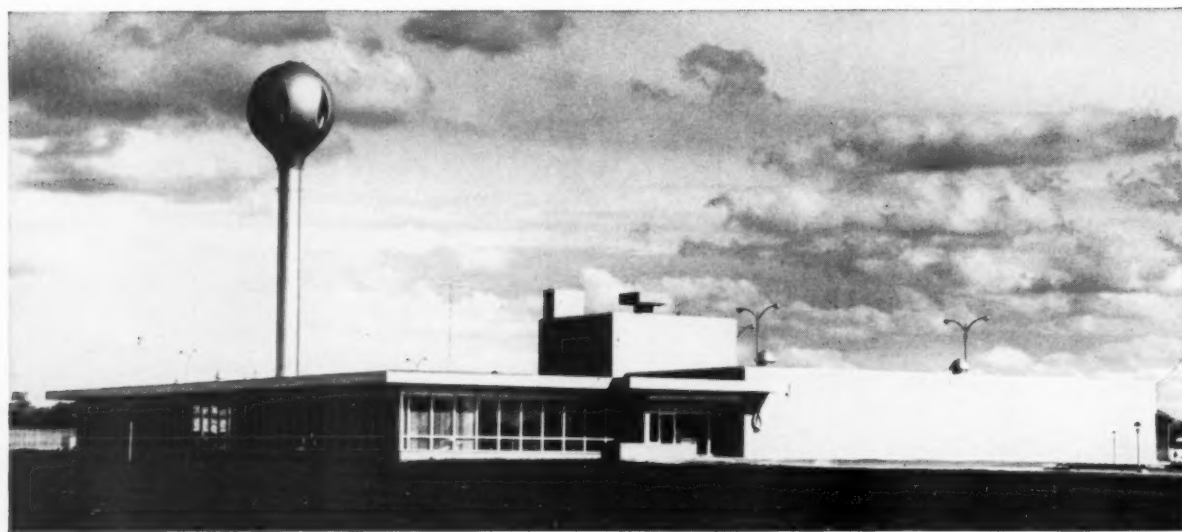
GOVERNMENT IN SCIENCE AND ENGINEERING—PAGE THREE

AUGUST, 1958

No. 3



# A New GAS HEADQUARTERS Now Serves the Joliet Area



This modern building at Gougar Road on Route 30, just east of Joliet, marks another important step in our long-range plan to keep pace with the growth and development of our 20-county service area. It provides efficient quarters for our Joliet District operations and the administrative offices of the Southern Division.

Like similar new facilities in other sections of northern Illinois, the Joliet Headquarters is located close to the center of the area it serves. This advantage makes for even better service now and the importance of being "in the middle of things" will

continue to grow as the use of gas in the Joliet area expands.

The Joliet Headquarters is one of numerous important projects included in our substantial new construction program. Some are on the drawing board; others, far beyond the blueprint stage, will soon become realities. All are part of our continuing plan to bring the finest possible gas service to homes, businesses, and industries in the fast-growing Joliet area and throughout northern Illinois.



PROMPT... COURTEOUS

...DEPENDABLE SERVICE

MIDWEST ENGINEER  
Published Monthly  
BY  
THE WESTERN  
SOCIETY OF ENGINEERS  
AT  
84 EAST RANDOLPH STREET  
CHICAGO 1, ILLINOIS

William R. Marston.....President  
Hjalmar W. Johnson.....1st Vice-President  
John T. Rettaliata.....2nd Vice-President  
Raymond D. Maxson.....Treasurer  
J. Earl Harrington.....Executive Secretary

*Trustees:*

Robert H. Bacon Arthur R. Harris  
Philip L. Coleman Ernest R. Hendrickson  
John R. Conrad Carl A. Metz  
Clifford B. Cox Howard R. Olson  
Frank W. Edwards Ernie A. Schmidt  
Virgil E. Gunlock Frank V. Smith

George L. Jackson.....Past President  
Ormas G. Smith.....Past President  
William G. Fulton.....Chairman, Publications  
Committee

J. EARL HARRINGTON  
*Editor and Business Manager*

HAROLD K. EATON  
*Managing Editor*

GENERAL AND EDITORIAL OFFICES  
HEADQUARTERS OF  
WESTERN SOCIETY OF ENGINEERS  
84 E. RANDOLPH STREET  
CHICAGO 1, ILLINOIS  
TELEPHONE: RA NDOLPH 6-1736

The Society does not assume responsibility for statements and opinions in articles, papers and discussions appearing herein. All material must be submitted on or before the 10th of the month prior to date of publication.

Copyright 1958 by the  
WESTERN SOCIETY OF  
ENGINEERS

Permission is given for the reproduction of any material herein, provided due credit is given.

Single Copy .....\$ .50  
Annual subscription ..... 4.00  
Foreign subscription ..... 6.00

Entered as second-class matter at the post office at Chicago, Illinois under the Act of March 3, 1879.

# Midwest Engineer

A Publication of the

WESTERN SOCIETY OF ENGINEERS

*Serving the Engineering Profession*



August, 1958

Vol. 11, No. 3

## CONTENTS

Government in Science and Engineering .....	3
The Industrial Engineering Profession .....	5
News of Engineers .....	11
Book Reviews .....	13
New Products .....	18
Professional Directory .....	22, 24
ESPS Listings .....	26
Applications .....	28
Advertisers' Index .....	31
Obituaries .....	32

## COVER STORY

On August 20 and 28 parts of the Illinois tollway system opened for business. The rest of the system is scheduled to be in use about the end of this year. Our cover picture shows what the motorist on Illinois' new Northwest Tollway will see: right-of-way 250 to 300 feet wide; four to six lanes of 10-inch reinforced concrete with outside shoulders of 11-foot-wide asphalt to allow emergency parking clear of traffic; inside shoulders four to five feet wide providing extra margin of safety for motorists who inadvertently leave the pavement in a passing movement; and a wide, depressed median strip between opposing lanes to prevent cross-over accidents and minimize effect of headlight glare.

—Illinois Tollway Photo



# GOLF TOURNAMENT at INVERNESS GOLF CLUB

September 11, 1958

TEE-OFF TIME 8:00 A.M. to 2:00 P.M.

DELUXE DINNER - 7:30 P.M.

*For the First Time*

## LADIES INVITED FOR GOLF AND DINNER

### PRIZES GALORE

### PRIZE CONTRIBUTIONS WELCOMED

See the orange  
Announcement  
recently mailed  
to you for full  
information.

Western Society  
of Engineers





# Government in Science and Engineering

by  
Dr. E. A. Eckhardt

According to the program notes I am expected to discuss with you the present role of government in supporting basic research and its relation to the engineering sciences and to indicate how and why this may change. I have not attempted to achieve a balanced presentation of the subject, but I believe that by the time I finish I will have managed to identify and illuminate some of the key questions involved. Though I am a representative of the National Science Foundation, I am not attempting to speak for it. Facts are facts and interpretations are personal. To have tried to achieve complete conformity would have violated the spirit of this occasion. However, I do not anticipate being disowned by the Foundation because of anything I may say.

## Engineering Achievement

If you are expecting to be invited to join me in putting on our space helmets and to blast off into the wild blue yonder, you are due for disappointment. While engineering will play a dominant role in the new space age about which we hear so much, it also will have important things to do at home, on terra firma. It is surprising to note how seldom the placing of sputniks, explorers and vanguards (singular or plural) into orbit is referred to as, first of all, an engineering achievement, as it is. To be sure, much basic research preceded the

operation of designing, developing and launching the satellites, but the effort that produced them and flung them into orbit was essentially an engineering effort.

One could easily conclude from what one currently hears and sees that an exciting future awaits the engineer in outer space. I would not wish to discourage anyone who finds a challenge in these concepts, but I also have a word of comfort and encouragement for those who prefer to stay at home. They also will find much exciting and worthwhile work to do.

The American public was obviously stunned when the Russians were the first to put a satellite into orbit. The reaction was not unlike that in the college town when the home team, after a long winning streak, loses the homecoming football game. Perhaps the events compared are of comparable importance, but there are also important differences. In the world of today, unless we insist on maintaining a leading position in science and technology, we cannot expect to maintain leadership in world politics and economics. In this technological age these three elements are very closely interrelated. Economic and political stature are practically impossible if scientific and technological stature does not precede them.

The struggle for scientific supremacy will be won or lost in the research lab-

---

Dr. Englehardt A. Eckhardt, Assistant Director, Mathematical, Physical and Engineering Sciences — National Science Foundation, Washington, D.C., presented this talk before a meeting of Engineers Joint Council in cooperation with the Western Society of Engineers on May 19, 1958 in Chicago.

oratories of our universities and our industries. The universities traditionally have been the centers where the accumulation of human knowledge is stored, where it is made available for use to the present and future generations and where the store of knowledge is increased through research. The universities are uniquely qualified to perform these functions for the society which they serve. The existence and the functions of industrial research laboratories do not essentially change this picture since the amount of basic research done by them which is unrelated to the direct needs of industry is small, though generally high in quality.

The research laboratories of the country represent an important national resource. The strength of this resource was amply demonstrated during World War II when military problems demanded an almost unbelievable expansion of the research effort to meet the national need. The organization under which this was accomplished was the Office of Scientific Research and Development, and the money required was obviously provided by the Federal government. By every test this effort was

tremendously successful. But as the end of the war approached, it became obvious that the universities would be left with greatly increased research interest and capabilities which they themselves could not afford to support financially.

There were some who felt that, like the military battalions, the research forces would have to shrink back to peace time proportions. Fortunately there were many more others who felt that to do this would be a national calamity. At the forefront of these was a distinguished engineer, Vannevar Bush, the director of the OSRD. On Nov. 17, 1944 President Roosevelt wrote Dr. Bush a letter from which the following quotations are significant:

"There is, however, no reason why the lessons to be found in this experiment (meaning O.S.R.D.) cannot be profitably employed in times of peace."

"What can the Government do now and in the future to aid research activities by public and private institutions?"

"Can an effective program be proposed for discovering and developing scientific talent in American youth so that the continuing future of scientific research in this country may be assured on a level

comparable to what has been done during the war?"

"New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war, we can create a fuller and more fruitful employment and a fuller and more fruitful life."

It is clear that President Roosevelt visualized a research program continuing at the level reached during the war years and having the same vision, boldness and drive. He also showed concern for the availability of manpower to support such a program and a realization that such a program could and would have a great and direct effect upon the national welfare.

#### National Science Foundation

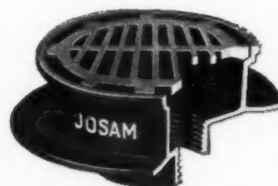
Dr. Bush responded to these concepts and questions in a report dated July, 1945 entitled "Science, the Endless Frontier." In it the National Science Foundation was first visualized. The report spelled out its organization and functions. It was not until five years later, however, that Congress enacted the law which brought the Foundation into being.

## Say, Engineer!

Do you like to DRIVE?

*Then why not drive to WSE meetings and other functions?  
There's plenty of PARKING almost at the door—the Underground Garage is diagonally across the street from WSE Headquarters, two private garages are a block west, and the State-Wacker "Bird Cage" Garage is only a short distance away.*

Super  
DRAINAGE  
Super  
ECONOMY



**SUPER-FLO  
FLOOR DRAINS**

*Super-drainage* because the Super-Flo drain has perimeter slots around the grate which increase the free drainage area of the top permitting greater flow rate (GPM) into the drain body at any head. Waste water enters perimeter slots first, reducing friction loss and increasing flow rate into the Super-Flo drain.

*Super-economy.* Because increased flow rate at any head permits drainage of the same or more GPM than a standard type floor drain of the same size top or larger, a smaller top size Super-Flo drain may be used. For example a 7" top diameter Super-Flo drain can be used instead of a 9" top standard drain at considerable savings.

Call or Write for Literature

DISTRICT REPRESENTATIVE  
**SULLIVAN & LOVE**

222 West Adams Street

Chicago 6, Illinois

STate 2-2626

**JOSAM MANUFACTURING COMPANY**

Michigan City, Indiana



In the Act the functions of the Foundation are enumerated in eight terse paragraphs. To state and analyze them here would go beyond the purposes of this symposium. Three of them are particularly pertinent to our discussion, and I will quote them in condensed form, omitting only qualifying words or phrases which do not change their essential meaning. They are:

(1) "to develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences."

(2) "to initiate and support basic scientific research . . . and to appraise the impact of research upon industrial development and upon the general welfare."

(4) "to award . . . scholarships and graduate fellowships. . ."

It is to be noted, first of all, that the word "education" appears only once in the statement of function, and that this is in connection with national policy. It is basic research that is to be supported rather than organizations doing basic research. The existence of vigorous institutions where such research could be supported is taken for granted. On this point wide difference of opinion exists within the scientific community. This difference can perhaps be most vividly illustrated in terms taken from the field of horticulture. One view is that the existence of healthy flowering plants should be assumed and that the support operation is comparable to spraying the flowers so that more of them will set fruit. At the other extreme are those who believe that just feeding the plant is the best way to insure a bountiful crop of fruit. Either of these things could be done broadly or selectively or in combination to various degrees. The applications for research support which the NSF receives pretty well reflect the full spectrum of these attitudes. The choice to be made clearly depends on how the greatest yield of fruit can be secured from a given level of expenditure.

There can be little doubt that President Roosevelt, Dr. Bush, and the Congress had in mind the direct support of basic research activity which would create an increasing pool of basic scientific information out of which applications would emerge to the public benefit. The hard core of Foundation activity should be to selectively and directly support those research activities which, in the

judgment of the research scientists themselves, will make the most significant contributions to the pool. The activity of the Foundation in the field of education should be first of all centered on the development of the research scientists required to staff this research effort. It is the research results which are important to the public welfare and the securing of which justifies the use of public money.

To some of you it may seem that this is a cold and too objective view, lacking in understanding of any sympathy for the very serious financial problems being faced by all universities because of the rapid growth of our school population. This is a problem which involves the entire curriculum and its solution is hardly

**A**n automobile that is both literally and figuratively a "dream car" has been built by a California inventor, "Electrical Wholesaling" says. The completely electronic car stops, steers and follows all safety standards while the driver sleeps, and it does not need a cable built into the road to guide it. The only drawback is that police car transmitters override its electronic system and cause the car to veer slightly.

to be sought by dealing with it piecemeal. The cure of a malady is not to be found in prescribing a medicine designed for another. The meeting of this need has to be applicable across the board.

#### Eight Years Old

The National Science Foundation is now nearly eight years old and the Budget Bureau is already asking questions which indicate that, if not now, sooner or later the Foundation will be expected to identify researches which it has supported which have had important practical consequences, which have had a favorable effect on the lives of the American people. If the interest in government for the support of basic research is not to be dulled, the answers to these questions must not consist of generalities. They must be specific.

On the other hand all here present know that many of the most important

practical developments have grown out of basic researches which were not motivated by a possibility for application and for which none were visualized at the time. The entire electrical industry, which is an important element in our economy, emerged out of such research and other examples will readily come to mind. The impossibility of examining the present research plans of all U. S. scientists and identifying those which will have important economic consequences will be readily conceded by all scientists.


This does pose the question whether one should show any preference for researches for which applications can be visualized. From what has just been said it is obvious that with such a point of view one would fail to support some of the more important researches. In the case of the Engineering Sciences, however, the case is somewhat different. Their task is to identify the applicability of basic science to the satisfaction of human needs or, alternatively to develop the basic science required to satisfy an identified need. In the case of the Engineering Sciences I believe it appropriate to show some degree of preference for basic researches which have some relationship to a practical need. Even here, however, the possibility of imagining an application at the time should not be a prerequisite to support eligibility.

#### Unfortunate Term

The public relations of the research community have been adversely affected by the use of the unfortunate term "useless research." This term is used largely by members of the community who seem to believe that researches having no foreseeable use are of a higher intellectual quality. To the extent that this view exists the community disqualifies itself as deserving of public support. The public does not wish to support useless activities.

And speaking of public relations the scientific community, including the National Science Foundation, has a problem. The nature of the public reaction to the sputniks illustrates it. The reaction was that we need more scientists and there has been a great deal of talk about how to improve our science teaching in the lower schools and how do we stimulate an interest in science in greater numbers of our bright young teen-agers.

(Continued on Page 14)



## COMBUSTION ENGINEERING, INC.

The huge riverside crane at Combustion's Chattanooga Division, capable of lifting loads in excess of 250 tons, is about to ease the reactor vessel into a 195-ft. barge which will transport it via the Tennessee and Ohio Rivers to Cincinnati. From there it will travel by rail to the Enrico Fermi Atomic Power Plant at Lagoona Beach, Michigan — 30 miles below Detroit.

# AMERICA'S LARGEST NUCLEAR COMPONENT

The nuclear reactor vessel shown here is the most remarkable stainless steel pressure vessel ever built. This 36-foot, 92-ton giant is the container for the nuclear furnace that will power the world's first full-scale, fast-breeder reactor power plant — the Enrico Fermi Atomic Power Plant. Designed by Atomic Power Development Associates, Inc., the nuclear section of this plant will be owned by Power Reactor Development Co., and the turbine-generator section by Detroit Edison Co.

Because of its vast size and complexity, the reactor vessel presented unique problems of design and fabrication. In reality, it comprises four separate cylindrical vessels welded together to form a single unit assembly, plus a large amount of internal shielding the fabrication of which involved the use of 65,000 square feet of stainless steel — all constructed and assembled with a precision never before attempted in

work of this size and character. Additional parts of the vessel, scheduled for later shipment, will bring its total weight to about 200 tons.

No more than two or three plants in the world presently have the skills and facilities even to undertake the production of work of this kind. Combustion not only has the men and machines, but also the experience to produce such reactor vessels. Moreover, it is equipped and qualified to design and manufacture all other major components of complete nuclear power systems.

The Enrico Fermi Plant exemplifies the continuing, urgent drive by electric utility companies to generate electricity at the lowest possible cost, utilizing all developments modern science and technology can produce. Combustion is proud to have shared in this major step of the power industry to prepare itself for the age of the atom.

## COMBUSTION ENGINEERING

Combustion Engineering Building • 200 Madison Avenue, New York 16, N. Y.



C-158

ALL TYPES OF STEAM GENERATING, FUEL BURNING AND RELATED EQUIPMENT; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; SOIL PIPE



# The Industrial Engineering Profession

by James H. Greene

**T**HE INDUSTRIAL ENGINEER—Who is he? The members of a traditional Industrial Engineering department doing methods work; some specialist advising top management by employing Operations Research techniques, or, is he perhaps the head engineer in the organization, such as the plant manager, who is responsible for bringing all of the production facilities together into an economic system? In fact, isn't the Industrial Engineer the man responsible for bringing men, machines, and material together for the economic production of goods?

In any industrial organization there is a continuum of jobs which leads from the lowest office boy up to the chairman of the board. Refer to these stages as the boxes of an organization chart or the rungs of a ladder, or whatever, it still remains a basic fact that the requirements for a job start at the bottom and progress upwards.

Another basic fact is that an individual finds his place in this broad range of jobs according to his ability. Perhaps this is not true in a short view but in the long view one is inclined to agree that the individual finds the rung of the ladder which best suits his ability. Ability here does not refer to the rare quality found in the genius but that which is contained in every one to mature through experience and assume more responsible positions.

If the organization structure is static but the flow of personnel is dynamic because of changing ability, then there must be a flow which moves from the

bottom to the top. If a professional group, such as Industrial Engineering is designated by a department, which is just a rung of the ladder, then reference is being made either to a static group or a transient group moving through a stage of growth. This is a basic weakness which affords little opportunity for growth of a professional society.

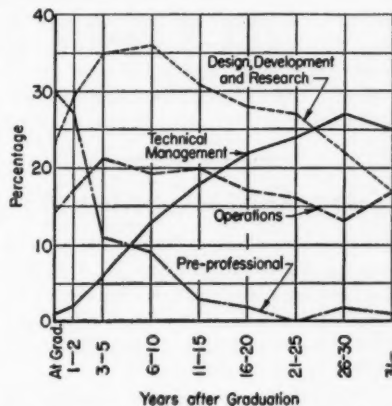
On the other side of the picture is the Industrial Engineer cultist who would have the Industrial Engineer serve as a staff advisor to top management. Such an industrial chamberlain occupies an impossible and unrealistic position. In the first place, there is probably no true staff position outside the imagination of the organization-chart draftsman. Beyond this, if we believe that the organization is dynamic, there will be no place for this "staff" man to go which is contrary to the drive of personal ambition. It is unreasonable to expect an individual to remain long in the shadowy area of a staff function without moving upwards. This situation of a pure staff individual is, in addition, dangerous to an organization's future for it offers no line of progression from the bottom upwards thus leaving the possibility of voids at the top.

And so it becomes apparent that defining a profession as a department or as a particular staff function is not satisfactory. A better approach is to define the Industrial Engineer as one who is especially skilled in bringing the factors of industry—men, machines, and material—together for the economic production of goods. By this definition, probably the best Industrial Engineer in a company is the head of the productive organization. It is true that this individual may be lacking in recognized

Industrial Engineering training but with the present shortage of trained Industrial Engineers, he is the best available.

The truth is there are indications that this demand for Industrial Engineers is being filled by other engineers. They do not in most cases have the broad knowledge of accounting, economics, processing, psychology, physiology, etc., expected of the Industrial Engineer. These engineers, therefore, must make up this deficiency by years of experience.

Evidence of this and the typical promotional structure was brought out in a recent survey of graduate engineers.<sup>1</sup> In response to a question concerning functional employment for specific time intervals since graduation, the following distribution was found:



A higher percentage of the graduates are engaged in design, development and research than any other function up to the period of six to ten years after

1. "A Report on the Purdue University Engineering Graduate" (1958) Purdue University, West Lafayette, Indiana.

James H. Greene, Ph.D., the author of this article, is Associate Professor of Industrial Engineering, Purdue University, Lafayette, Indiana.



graduation. This percentage then declines to half of the maximum thirty-one years after graduation.

Technical management, on the other hand, increases steadily from a very low percentage at graduation to more than twenty-five percent at 26-30 years after graduation. The category of Technical Management which is descriptive of the professionally mature Industrial Engineer was defined in the questionnaire as—Determining the main purposes and setting up policies which involve technical decisions on planning, producing and distributing. The percentage of graduates engaged in operations which include construction, maintenance and the restricted area of production pertaining to processes, tool and methods declines as technical management increases.

From this it would seem apparent that the engineer upon graduation first fills those strictly technical positions for which he was trained in college. As he gradually obtains a broader knowledge and greater abilities, the trend is for him to become involved in the technical management that the Industrial Engineer is best equipped to handle.

What does this mean to a person seeking a future as an Industrial Engineer? First, he must have a good technical background to obtain an entrance, let alone move upwards. But to this he must add the knowledge of how to bring men, machines, and materials together to produce goods economically. It is this last qualification which makes the Industrial Engineer unique; for not only must he be a competent engineer but he must have these additional abilities—and with these abilities he can anticipate an exciting and fruitful career.

## Vitro Gets Contract

Vitro Engineering Company, a division of Vitro Corporation of America, has been awarded contracts for operation and maintenance of two additional SAGE power facilities, it was announced in New York on July 28.

This brings to six the number of SAGE power facilities in the U. S. air defense network operated by Vitro.

SAGE (Semi-Automatic Ground Environment Control), is the heart of America's air defense. It is a system which employs digital computers to assimilate data essential to the nation's defense against air attack.

## Hail! The Name is Columbium

Hail, columbium!

Hereafter, so far as the 30,000-member American Institute of Mining, Metallurgical, and Petroleum Engineers officially is concerned, the lustrous, steel gray metallic element, columbium, is going to be called columbium. And the lustrous, steel gray element, niobium, also will be called columbium. For they are the same element and the Board of Directors of AIME, acting to dissipate long-standing confusion, has voted to call columbium by the name it has had since its discovery and not by what many metallurgists regard as a relatively Johnny-come-lately name, niobium. This is especially essential as columbium is used preponderantly as a metal or alloy and is of comparatively little significance in the chemical field.

A rose by any other name may smell just as sweet, but the Board's action reflects a widespread conviction among metallurgists that what applies to the flower should not justify the use, in referring to Element 41, of two names where one will suffice.

Columbium has come into increasingly important use, including its role in nuclear reactors, jet engines and other high temperature applications. For some time, columbium has been called just that in the *Journal of Metals*, published by

The Metallurgical Society, and *Mining Engineering*, magazine of the Society of Mining Engineers. Both are constituent organizations of the American Institute of Mining, Metallurgical, and Petroleum Engineers.

### Discovery Announced in 1801

As recounted in the *Journal of Metals*, columbium came into metallurgical nomenclature when its discovery was announced in a paper read on Nov. 26, 1801, before the Royal Society, London, by Prof. Charles Hatchett. His review, entitled "An Analysis of a Mineral Substance from North America Containing a Metal Hitherto Unknown," described his experiments with a mineral found in Massachusetts, a sample of which had been sent by a "Mr. Winthrop" to Sir Hans Sloane, who had deposited the ore in the British Museum.

Referring to a "scarcely legible" writing accompanying the sample, Hatchett thought the mineral had originated in what appeared to be Nautneague, an Indian name. In any event, it did come from the Massachusetts area and, being aware that the people of the United States attached derivatives of Columbus' name to many places and that this custom often applied to scientific discoveries, Hatchett had this tradition in mind

## W. H. LYMAN CONSTRUCTION CO.

### General Contractors

134 N. LA SALLE • CHICAGO • RANDOLPH 6-0200

as he pondered a name for the element. This has been a consideration, too, for the many who always have insisted on columbium as its just name.

"Considering that the metal is so very different from those hitherto discovered, it appeared proper that it should be distinguished by a peculiar name," Hatchett urged upon the Royal Society. "Having consulted with several of the eminent and ingenious chemists of this country, I have been induced to give it the name of Columbium."

Thus, Hatchett, following custom often practiced in the naming of scientific discoveries, indicated the area of origin. The ore became known as columbite. But, recites the *Journal of Metals*, events brought about the paradox of two names for the same metal and a "controversy which has raged unabated for over 150 years."

#### Tantalum Discovered in 1802

Ekeberg in Sweden in 1802 discovered an element he called tantalum. It was reported, erroneously, to be identical with columbium. The latter, even that early, seemed fated to be the victim of confusion and confusion compounded. The mistake as to columbium and tantalum flourished over four decades. Then one H. Rose, in the *Chemical Gazette*, London, after researches on columbite, reported that the mineral contained what he supposed to be a new metal and which he named niobium. Says the *Journal of Metals*:

"By the time it was realized that Hatchett's columbium was not Ekeberg's tantalum, but, rather, Rose's niobium, usage had given niobium something of an advantage; *reductio ad absurdum*."

In 1854, Prof. A. Connell, of London, pointed out in a scientific publication that Rose had been in error. Connell emphasized that columbium and niobium were the same and that columbium and tantalum were not the same.

The story of this confusing development was clarified by J. Lawrence Smith, of Louisville, Ky., in May, 1877, in the *American Journal of Science*. He observed, by way of introducing the subject, that it was "the common practice" of American chemists and mineralogists "to speak of the metal which is called Niobium by English and continental chemists, as Columbium." The article commented: "This is eminently just, since the metal was discovered and well

defined and named columbium forty-five years before the name niobium was given to it. The change of name was caused by a double mistake in no way connected with the original observations in 1801 by Professor Hatchett."

The J. Lawrence Smith article further observed: "The result of Rose's researches was in fact simply the demonstration of the actual difference of columbium and tantalum; for Hatchett's discovery was clear, precise and well made out, and has never been controverted." Instead of calling columbium by the name of niobium, said Smith, "its original name should have been left to it." He added: "It is but right, just and in accordance with chemical and mineralogical precedence that the name given by the discoverer should replace that of niobium, which originated forty-five years later."

"A point of less importance, but worthy of some consideration is that this element derived its name from the country in which it was discovered, it being the first and, up to the present time, the only element discovered in that part of America usually named Columbia."

However, at the time of the Smith article, though tantalum had been recognized as being distinct, the names columbium and niobium had grown into synonymous use. "And so the problem has come down through the years," the *Journal of Metals* has written, adding

that to all commercial users of metal, columbium is the accepted name. Columbium stabilized stainless steel is a fully accredited standard grade and ferrocolumbium is a recognized alloy for making columbium containing alloys. No melting metallurgist—largest, by far, user of columbium—thinks of any other name. Yet, the chemists and some metallurgists still insist on niobium. In 1949, this insistence took the form of a resolution of the International Union of Pure and Applied Chemistry, adopting the name niobium, concurred in by the American Chemical Society and the National Research Council. No metallurgical society has approved this change.

As to why it was felt necessary for AIME to make a decision now, the *Journal of Metals* says: "At the present time, with the metal playing an increasingly important role in high-temperature metals and reactor technology, the need for a single name becomes more and more necessary. . . . Niobium is not the proper name for Element 41. A wrong, even though far removed in time and space from its inception, remains a wrong."

#### Cold Weather Cell

A silver-zinc cell containing a new powder, provides heat that permits a battery to go to work instantly, even at temperatures far below zero, reports *Product Engineering*.

## FEDERAL PIPE & SUPPLY CO.

900 S. CAMPBELL AVE.

CHICAGO 12, ILL

PIPE — VALVES — FITTINGS

PIPE FABRICATION

SEELEY 3-6960

# Research Program is Announced

Organization of a \$250,000 co-operative research and development program to step-up the progress of the high-speed era in urban transportation heralded by Chicago's new West Side Subway, was announced recently by V. E. Gunlock, MWSE, chairman of Chicago Transit Board.

America's first significant project to combine rail rapid transit with a grade-separated, multi-lane expressway (the Congress Expressway), the new subway is credited by transit experts with marking an epoch in urban area transportation.

Objectives of the research program are the development and testing of lightweight rapid transit trucks, gear drives, axles and auxiliary braking specially designed for high-performance operation of lightweight, all-metal rapid transit cars in the rights-of-way of multi-lane, grade-separated expressways.

Highest speed of upward of 75 miles per hour, a longer period of acceleration at the fast rate of  $3\frac{1}{2}$  miles per hour per second, and enhanced passenger comfort and safety are the results expected.

CTA's associates in this latest of its pioneering ventures are the Transit Research Corporation of New York; the Westinghouse Electric Corporation of East Pittsburgh, Pa., the General Electric Company of Erie, Pa., the Budd Company of Philadelphia, the General Steel Castings Corporation of Granite City, Ill., the St. Louis Car Company of St. Louis, Mo., the Dana Corporation of Toledo, Ohio, the Westinghouse Air Brake Company of Wilmerding, Pa., American Steel Foundries of Granite City, Ill., the Timken Roller Bearing Company of Canton, Ohio, and SKF Industries, Inc., of Philadelphia, Pa.

Five of the 100 rapid transit cars now being built for CTA by the St. Louis Car Company are to be equipped with the products of this research and development program. These five cars, each a single unit, double end car, will be test-operated as a train in the West Side Subway service, beginning next Spring or Summer.

All of the participants are making substantial financial contributions to the research and development program. Engineering services and some components are to be provided on a cut-down cost basis; other components are to be pro-

vided on a long-term test basis with option to purchase, and still other components are to be provided without cost.

"In our opinion," Mr. Gunlock said, "the integration of rapid transit with the Congress Expressway has launched a new era in transportation for heavily-populated urban areas. With proper equipment and operating methods, this combination of transportation facilities can meet today's needs in moving masses of people faster, safer and with greater comfort.

"Furthermore, integration is the efficient, economical approach to a solution of large urban area transportation problems. At only a fractional additional cost, the passenger-carrying capacity of an expressway can be increased at least three-fold, thus reducing the need for additional tremendously costly multi-lane expressways. Consequently, the utmost value can be obtained for each dollar spent for transportation facilities.

"Chicago is committed to the principle of combining rapid transit facilities with programmed additions to its expressway system. CTA and its associates in this research and development venture are fulfilling their obligation to design transit equipment for this new era in urban transportation."

St. Louis Car Company, using Transit Research Corporation designs, will build three car-sets of trucks (one set for each of three cars).

One set will be equipped with General Electric 100 h.p. motors, G.E. axles and gears, a conventional propeller shaft, Transit Research Corporation's conventional center-bearing support for the car body, and a combination of coil steel and rubber springs. G.E. control equipment will be installed. The second set of trucks will be equipped with Westinghouse 100 h.p. motors, and the Dana Corporation close-coupled gear drive unit which eliminates the conventional propeller shaft. The body will be supported by center plates with side bearings, and the springs will be a conventional combination of coiled steel and rubber. The third set of trucks will be equipped with Westinghouse 100 h.p. motors, a Dana Corporation drive unit incorporating a torque tube instead of the conventional propeller shaft, center bearing car body support, and flat leaf springs. Westinghouse controls will be

used with the motors for these two car-sets of trucks.

General Steel Castings will build one car-set of trucks to its own specifications. This set will be equipped with General Electric 100 h.p. motors, G.E. gear units, a conventional propeller shaft, center bearing support for the car body, and a combination of coiled steel and rubber springs. Control equipment will be supplied by G.E.

The Budd Company will build one car-set of trucks to its own specifications, and equip them with Westinghouse 100 h.p. motors and the close-coupled gear drive unit that eliminates the propeller shaft. The body will be supported on a combination of center and side bearings, and will rest on air springs. Control equipment will be supplied by Westinghouse.

Gear and axle unit bearings will be supplied by Timken and SKF for all five car-sets of trucks.

The 100 h.p. motors and controls to be used were recently developed through a co-operative, cost-sharing arrangement CTA had with Westinghouse and General Electric.

**THE MONADNOCK**  
53 West Jackson Blvd.  
Chicago 4

LONG RECOGNIZED AS  
*Headquarters  
for Office Space*  
FOR  
**Engineers  
Architects  
Patent Attorneys  
Manufacturers'  
Representatives**



*A nationally-known business address*



## News of Engineers

**Catherine W. Eiden**, Western Society of Engineers member, has been elected president of the Society of Women Engineers. The Society is the national professional organization for graduate women engineers.

Miss Eiden, an Illinois Bell Telephone Company supervising engineer, has been Women's Engineers' treasurer for the past two years. She is a charter member of the Chicago section and has served as section director and chairman.

Miss Eiden attended Mundelein College, and lives at 320 Wisconsin, Oak Park.

\* \* \*

**William F. Crawford**, vice president, Republic Flow Meters Co., a subsidiary of Rockwell Manufacturing Company, has been named president of Republic according to an announcement by **James D. Cunningham**, MWSE, founder of the company. Mr. Cunningham moved up to the post of chairman of the board. Both changes took place August 1.

Cunningham founded Republic in 1911 to make mechanical and electrical controls for the electric and gas utility industries. The firm, located on Chicago's northwest side, is a major supplier of instruments and special equipment to the power, chemical, and petroleum industries. Republic Flow Meters became a part of the Rockwell Manufacturing Company in March, 1957.

Crawford is also president of Edward Valves, Inc., East Chicago, Ind., and president of Valve Products, Inc., Knox, Ind. Both Edward Valves and Valve Products are subsidiaries of Rockwell. Crawford is a vice president and a director of Rockwell.

Cunningham is chairman of the Board of Trustees of Illinois Institute of Technology, Chicago. He is also on the board of Allis-Chalmers Manufacturing Company, the Baltimore & Ohio Railroad, Lumberman's Mutual Casualty Company, and the Lake Shore National Bank. He is a past president of the American Society of Mechanical Engineers. He served as a trustee of the Western Society of Engineers from 1935 to 1937.

Crawford is a director of Washington Steel Corp., Cenco Instruments Corp.,

Central Scientific Co., and the First National and Union National Banks of East Chicago.

\* \* \*

Promotion of **R. H. (Dick) Owen** to the position of manager of a newly-formed manufacturing engineering division at Beech Aircraft Corporation, Wichita, Kansas, was announced by **Frank E. Hedrick**, Beech vice president-director.

Owen, manufacturing engineering department manager since 1956, assumed direction of the new division August 1. Establishment of a manufacturing engineering division is another step toward greater production efficiency, Hedrick said.

The change consolidates the functions of tooling, manufacturing methods and planning, process engineering and testing, and plant layout under one organizational unit. Previously, tooling and manufacturing engineering were operated as individual departments.

Owen is a veteran of 23 years of aircraft manufacturing experience. During World War II he served as an executive assistant with North American Aviation. He was in charge of subcontracting and purchasing at Convair before joining Beech in 1953.

\* \* \*

The appointment of **W. B. Albright** as district manager to head midwestern operations for the Electric Motor Division of A. O. Smith Corporation, Tipp City, Ohio, has been announced by **C. M. Poston**, general sales manager.

Headquartered at Chicago, Albright will supervise sales representatives of the Electric Motor Division in Illinois, Wisconsin, Missouri, Iowa, Minnesota, Kansas, Nebraska, South Dakota and North Dakota.

The new district manager, prior to his present appointment was fractional hp motor sales manager for the company. He has been with the Electric Motor Division sales organization for the past seven years.

Albright's appointment was another step in A. O. Smith's current program of reorganizing its field organization to improve sales and service operations.

Only last November the company expanded its motor line, and now offers motors for all fields in the 1/4 to 800 hp range.

\* \* \*

**Earl G. Angell**, a native Chicagoan, has been appointed to the post of district engineer for Minnesota and Iowa, according to **J. E. Buchanan**, president of The Asphalt Institute. Angell, 32, a registered professional engineer in the State of Minnesota, will work out of the Midwest Division office at St. Paul.

Before joining the Asphalt Institute's engineering staff, Angell was structural engineer with Thorshov & Cerny, Inc. Prior to that, he was employed by the Minnesota Highway Department in various capacities. These included Batch Plant Inspector, Engineering Aide, Field Inspector of Erosion Control Structures, and Street Inspector for Bituminous Surfacing. He served for 14 months during World War II and participated in the Navy's V-5 (Aviation Cadet Training) Program.

Angell received his engineering degree from the University of Minnesota in

**When  
Electrical  
Equipment  
Needs  
Repair**

**YOU CAN BE SURE...**



*When You Send It to*

**Westinghouse**

**In the Chicago Area**

**3900 West 41st Street  
LAfayette 3-5520**

7038

1951. He is a member of the Minnesota Society of Professional Engineers and Theta Tau Alumni Association.

\* \* \*

Two Chicago scientists have traveled to Warsaw, Poland, to participate in the Symposium on Non-Homogeneity in Elasticity and Plasticity, organized by the International Union of Theoretical and Applied Mechanics Sept. 2 to 6.

They are Dr. Max M. Frocht, research professor of mechanics and director of experimental stress analysis at Illinois Institute of Technology, and Dr. Philip G. Hodge, Jr., professor of mechanics at IIT.

Frocht attended the symposium—first of its kind in a country within the Russian orbit—under the auspices of the Office of Ordnance Research of the U. S. Army and Illinois Tech. Hodge attended under the auspices of the United States Office of Naval Research and IIT.

Frocht presented major developments in his field at the conference through two papers—"Studies in Photo-plasticity" and "The Present State of

Three-Dimensional Photoelasticity." Hodge was slated to discuss "The Linearization of Plasticity Problems by Means of Non-Homogeneous Materials."

A native of Poland, Frocht received a bachelor's degree from the University of Michigan, a master's degree from the University of Pittsburgh, and a Ph.D. from the University of Michigan. He was on the faculty of Carnegie Institute of Technology from 1942 to 1946, when he joined the IIT staff.

Author of more than 60 scientific and technical papers on stress analysis, he also is author of several books on photoelasticity.

Hodge, a professor at the Polytechnic Institute of Brooklyn before coming to IIT, also has taught at UCLA and Brown University. He received his bachelor's degree from Antioch College and his Ph.D. from Brown University.

Hodge is author of approximately 40 scientific and technical papers on various phases of plasticity and is co-author and author of several books on plasticity.

\* \* \*

John F. Meissner Engineers, Inc., has announced that Dr. Wayne Teng, formerly of the faculty of the Illinois Institute of Technology, has joined their organization as head of the Structural Department. Dr. Teng, 38, has had a brilliant educational record and holds a masters as well as a Ph.D. degree in engineering.

Teng's early education took place at the National Central University of China in Chungking where he studied under General Chiang Kaishek, now president of the Nationalist Chinese Government.

Teng, formerly assistant chief structural engineer for Skidmore, Owings & Merrill, has had extensive experience in the structural engineering field. This includes a number of outstanding buildings in Chicago such as the new bank building of the Harris Trust & Savings Bank as well as the new Greyhound Bus Terminal. He was also in charge of the design of a number of structures for the new Air Force Academy at Colorado Springs, Colo. Previously, while associated with Sargent & Lundy, he participated in the design of a number of steam and atomic power plants.

\* \* \*

Joseph H. Enenbach, supervising engineer at the Illinois Bell Telephone

Company, has been elected president of the National Electronics Conference for 1958.

Other officers named for the 1958 Conference—to be held Oct. 13-15 at the Hotel Sherman in Chicago—are:

Executive vice-president, Milton H. Crothers, University of Illinois; secretary, Charles W. McMullen, Northwestern University; treasurer, James H. Kogen, Askania Regulator Company; executive secretary, Robert E. Bard, General Radio Company; and assistant treasurer, Gordon J. Argall, DeVry Technical Institute.

The National Electronic Conference, the nations leading forum on electronic research, development, and application, has been held annually in Chicago since 1944.

It is sponsored by the American Institute of Electrical Engineers, the Illinois Institute of Technology, the Institute of Radio Engineers, Northwestern and Illinois Universities. Participants are Notre Dame, Purdue, Michigan State, Michigan, Wayne State and Wisconsin Universities, Electronic Industries Association and the Society of Motion Picture and Television Engineers.

\* \* \*

Dr. Clark A. Dunn, of Stillwater, Oklahoma, has been elected president of the National Society of Professional Engineers.

A professor of civil engineering and executive director of the office of Engineering Research at Oklahoma State University, Dr. Dunn succeeds Garvin H. Dyer, of Independence, Missouri.

Dr. Dunn is a past president of the Oklahoma Society of Professional Engineers, and has served two terms as vice president of the National Society's Southwestern Region.

Six regional vice presidents and a treasurer were also elected for the administrative year which begins in July, 1958. The new vice presidents are: Harold A. Mosher, Rochester, N. Y., Northeastern Region; John B. McGaughy, Norfolk, Va., Southeastern Region; L. E. Easley, Indianapolis, Central Region; W. L. Hindermann, St. Paul, Minn., North Central Region; L. R. Durkee, Seattle, Western Region; and Noah E. Hull, Houston, Southwestern Region. Russell B. Allen, College Park, Md., was elected for his 11th term as treasurer.

## Chicago's Largest Office Building

A key location of convenience and prestige—that is the Insurance Exchange Building. A limited amount of space is currently available, and we will be glad to tell you what we have, if you will write to

## INSURANCE EXCHANGE BUILDING

**L. J. SHERIDAN  
& CO.**

Management Agent

175 West Jackson Boulevard

Chicago 4

Telephone WAbash 2-0756



# Reviews of Technical Books



## Mechanics for Engineers

*Mechanics for Engineers*, by Ferdinand P. Beer and E. Russell Johnston, Jr., McGraw-Hill Book Company, New York 36, N. Y. First edition, 1957. Pages, 696. Price, \$8.00.

This book is written for the standard courses in statics and dynamics taught in the sophomore or junior years of college. The objective of this volume is to provide the most complete coverage of any book in the field; to explain things in detail, clearly and simply, while maintaining a high standard of accuracy; and to furnish carefully chosen illustrative examples and problems of unusual quality and interest.

The book divides mechanics into the mechanics of particles and the mechanics of rigid bodies. It takes up the necessary operations with forces, then applies the concept of equilibrium to problems involving particles, thus introducing practical situations early in the course. The statics of rigid bodies is then considered both in two and three dimensions. In the following applications to bodies and structures the principal emphasis is on equilibrium. In dynamics, the three basic methods of analysis are first applied to problems involving only particles, so that the student can learn their respective advantages before facing the difficulties associated with the motion of rigid bodies.

## Strength of Materials

*Strength of Materials* by F. R. Shanley, McGraw-Hill Book Company, New York 36, N.Y. First edition, 1958. Pages, 783. Price, \$8.50.

This book is designed as a first text in college courses in engineering and science. Because of this, the order of presentation is given careful attention. An effort is made to keep the student conscious of the "level of abstraction" involved in every theory or method of analysis.

The text does not emphasize any particular field of structures, such as aeronautical or civil. Instead it contains material which forms the basis for all types of structural analysis and design. Examples and problems include practical cases from the fields of civil, aeronautical, and mechanical engineering.

The scope of the book has been expanded considerably beyond the usual limits for a text of this type. Certain principles of statics are reviewed in the early portion of the book and are extended to include two-dimensional force fields. Energy is included from the very beginning. Each subject is developed to a point where further refinement appeared unnecessary, from the engineering viewpoint, or where it would have been necessary to employ mathematical methods normally beyond the training of the student. In general, only the basic components of structures are treated. The analysis of indeterminate framed structures, for example, is left for specialized courses in this field. The experimental aspects of strength of materials are also omitted,

except for brief references to various methods that may be used.

Considerable emphasis is placed on the direct use of curves (such as the stress-strain diagram) and on the solution of problems by the use of tabular computation forms. Recent developments include: Inelastic Column Theory, Engineering treatment of buckling of thin plates and shells, and applications of moment-distribution method for solution of statically-indeterminate structures. Illustrative examples, numerous problems with answers to most of them, and key questions for each chapter complete the text.

## Introductory Graphics

*Introductory Graphics* by J. Norman Arnold, McGraw-Hill Book Company, New York 36, N.Y. First edition, 1958. Pages, 543. Price, \$7.75.

This new engineering drawing book emphasizes graphical solutions to engineering and mathematical problems. It is designed to help the beginning student of engineering in the graphic representation of objects, data, and physical phenomena, also in the solution of space and graphical analogue problems.

Part I, on Graphical Equipment and Its Use, covers lettering, inking, and the use of drafting tools for useful geometric constructions.

Part II, Graphical Representation, deals with multiview drawing and pictorial drawing. The conventional practices of working drawings and other aspects of things to be made or constructed are treated briefly. This section also includes the representation of equations, data, and physical principles in the form of graphs, charts, schematic diagrams, and vectors.

Part III, Solutions of Problems, concerns intersections and development of surfaces, functional design, map projections, and kindred space problems. Chapters on graphical calculus and empirical equations are also included.

In this text generally well-known subject matter has been freshly and adroitly reorganized to make it easier to learn and easier to use. Novel in the volume is the presentation of examples in the form of problems, with solutions alongside.

The many tabular problems, in which there is one diagram and a dozen sets of values for the lettered dimensions, are especially noteworthy. They enable the instructor to assign different students or groups problems similar in difficulty and principle, but with different answers. Among the topics presented for the first time in a work of this kind are: an elementary treatment of Map Projection; a chapter on Functional Design; and a chapter on Empirical Equations. The book contains over 900 illustrations and includes a special appendix with tables and data useful in drafting practice. A *Student's Notebook* and an *Instructor's Manual* are available.

## Government in Science

(Continued from Page 5)

These concerns have communicated themselves to the elected representatives and a considerable loosening of the purse strings for these purposes is in the making. There has been far less discussion about what our scientists do and about whether they are falling short of developing their full potential for lack of financial support. Surely, if we feel that our position in science has been challenged, we do not want to wait almost a generation to meet this challenge. We must meet it now and the resources we have to meet it are the mature, capable, well-trained, experienced and imaginative scientists who, for the most part, are to be found at our universities. They know what to do. All that is needed is to provide them the money they need to do their best. If we do that, we need not worry about the stature of the United States in science.

Well if this is so obvious, why isn't something done about it? You and I understand the importance of basic research to the national economy. We know that unless we keep on doing a lot of it, the rate at which applications develop will dwindle, the rate at which industry expands will diminish and new jobs will become available at a slower rate. This is what President Roosevelt said, somewhat less explicitly, when he wrote to Dr. Bush and I requote "New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness and drive with which we have waged this war, we can create a fuller and more fruitful employment and a fuller and more fruitful life." I am sure that you will agree when I say that the adequate support of basic research provides the best possible insurance that the children now in the grade schools will have jobs when they need them.

### Public Relations Job

While we understand this, I am afraid that the general public does not. Congressmen have heard from their constituents about education. They are keenly interested in what their constituents talk to them about. There is mighty little evidence that constituents talk to their elected representatives about basic research. So there is a public relations job for the research community, pri-

marily the universities, to do. Our door bells ring from time to time and when we go to the door, we find a neighborhood lady collecting for the cancer fund or for muscular dystrophy and other similar causes. Along with millions of my fellow citizens I gladly make a modest contribution. People have seen cases of these ravaging diseases, may have experienced them in their own families, and the cause enlists their sympathies. Millions give gladly. But have you ever imagined, as I have, what would happen if, instead, the ladies would ask for a buck for basic research? Many people would ask "what's that?" People are willing to have public money used for causes to which they are willing to contribute. Very few of them have any conception of what a research laboratory is like, or what is done there, and why it means anything to them. In most of the attempts I have seen to develop public understanding the scientist is usually so wrapped up in his subject that he fails to establish communication with his lay audience. The scientist wants the layman to join him in his laboratory. What is needed is for the scientist to come out of the laboratory to join the layman in every day life.

Sir Lawrence Bragg is well known as outstanding in the field of the popularization of science. In a recent article in *Nature* he pointed out forcefully the great advantage of showing the public

an experiment rather than describing it in words. Seeing the experiment brings to the viewer a sense of participation which is very effective in developing an interest. Although developing an interest in science in the general public may be helpful, this does not necessarily yield also an awareness of its importance in human affairs. Universities will have to increase their endeavors to engender greater public understanding of the contribution the university and its researches make to community life at times other than Saturday afternoons, and by community I do not mean only the campus site. I am a football fan myself, and I would be unhappy if a better balance could not be achieved without drastic action in the sports field. Public understanding of the relationship between science and the public welfare must be increased and the universities should recognize and shoulder this responsibility. Among the students enrolled today are included our future senators, congressmen, cabinet officers, governors, state legislators, etc. If they do not have this understanding when they leave the college campus, where are they to get it? Many of these will be taking courses preparatory to law, others will be attending law schools. Do they get this understanding there? Shouldn't they?

The problem is well nigh universal and was eloquently stated by Professor

## NASH BROTHERS CONSTRUCTION CO., INC.

Engineering Contractors

1840 South Kilbourn Avenue

Chicago 23

N. F. Mott of the University of Cambridge several years ago in a popularization of science lecture at the University of Virginia. He said "It is only too clear that, in this age of nuclear energy, antibiotics, and space travel, science is your business, whoever you may be. Too much of your money is spent on it, and the results affect you too much for you to be indifferent of what is done. Now I am a university professor and, in the phrase used by my University of Cambridge, my job is to promote education, religion, learning and research. We whose business is education have to concern ourselves with this problem, how we are to insure that the new generation who grow up to be administrators, political leaders, and business men shall have a proper understanding of this science which affects their world so profoundly. We discuss this problem only too frequently, when we meet together, in your country I believe as well as in mine. What we want to avoid, surely, and to some extent we have is a society of two mutually suspicious classes; the scientists, engineers, and technologists who do the work and set the rate of advance, and the administrators, soldiers, salesmen, security officers and common men and women who know that we have to have science, but who do not understand how the community should use it."

So far I have dealt with the appropriateness of Federal support for basic research and some of the obstacles to its maintenance and further expansion. We need also to examine the pros and cons of such support from the standpoint of the universities.

#### Federal Aid?

We all know that Federal aid to education has been a much debated subject for a long time. Many people think Federal intervention to better describe what would happen if positive action were to be taken in this field. In the minds of many intervention engenders the fear of control. The danger is real; it is not a mirage. If this is true of education as a whole, it is true also of its parts, and research is the part with which we are concerned. The able people in Washington who administer the Federal program of research support protest that they have no intention of controlling research, and most of them are sincere, but when they grant support to one research and deny it to another, this inevitably consti-

tutes the exercise of control. The research community therefore has reasons for being interested in the limitation of Federal support for research as well as its expansion.

Every Federal dollar of support first of all comes from some taxpayer somewhere in these United States. It gained nothing in potency by having made the trip to Washington and back. Should not the universities deal more aggressively with the problem of intercepting this dollar and saving it the wear and tear of the long trip? I cannot buy the idea that there is more wisdom in Washington than can be found on the campuses of our educational institutions. Decisions in Washington necessarily have a political flavor. The universities and the country have a great stake in maintaining the intellectual independence of our educational institutions.

This independence can be compromised in subtle ways. I have heard university people argue that since the Federal Government has acknowledged the public interest of basic research that if it supports any of it, it should support the whole of it. The support of research by the government falls into two principal categories. The first includes researches which are identified by the representatives of the government and for which a site is sought where competence is available to do the job the government wants done. This is essentially a com-

mercial arrangement and there can be no doubt that the government should pay its full cost, including all overhead. The second category consists of researches which the scientists at the universities wish to do themselves. In this case the government provides only money to assist the scientist in carrying out his own plans. I find considerable philosophical difficulty with the contention that in such a case the government should also pay the full cost. Such researches are also supported by private foundations and I know of no reason why the ground rules should be different for the government than they are for private organizations. I can, however, see considerable merit in the ground rules being the same for all government agencies operating in this support area.

#### "Now I Hope . . ."

Now I hope that the universities will never say that the cost of research has become so great that they no longer can be responsible for it. Some university people have come mighty close to saying that. Saying that they need financial help to discharge this responsibility is something quite different. To surrender this responsibility into other hands would make a basic and revolutionary change in our educational system. Before doing so the consequences had better be carefully weighed. In Russia the Kremlin decides the nature and extent of the

## JOHN BURNS CONSTRUCTION CO.

JOHN F. O'MALLEY, PRESIDENT

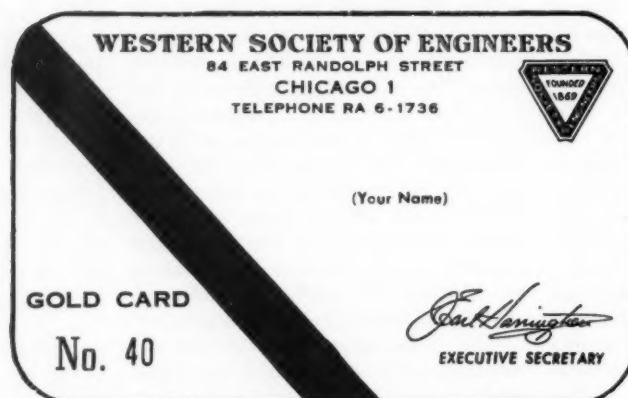
CEntral 6-9776

105 WEST ADAMS STREET

CHICAGO

# ESPECIALLY FOR YOU WHO VALUE FINEST CLUB SERVICES

... (at no extra charge) ...



We offer the use of GOLD CARD charge for your convenience. You have long appreciated the tastefully distinctive atmosphere of Western Society's lounge and dining room. Now to add to that enjoyment, we have available a service whereby you may sign for the excellent food and beverages served.

Monthly statements are issued for which no charge is made except that a minimum monthly amount of \$10.00 must be maintained through use of the lounge and/or the dining room.

Members who operate their own businesses or have expense accounts will find the GOLD CARD service a particular advantage since a complete record of expense is provided together with house checks to back this record.

Why not take full advantage of Western Society's facilities for business and professional entertainment through use of our GOLD CARD service so that you may sign house checks in the lounge or dining room?

CHAIRMAN, HOUSE COMMITTEE,  
WESTERN SOCIETY OF ENGINEERS,  
84 EAST RANDOLPH STREET, CHICAGO, ILLINOIS

Please send me a gold membership card that will permit me to sign for house checks at the bar and dining room. It is my understanding that the minimum billing for such an account will be \$10.00 a month. It is also my understanding that this arrangement will be on a till forbid basis and may be cancelled at the end of any calendar month on 30 days prior notice in writing.

NAME (PRINT) \_\_\_\_\_  
ADDRESS \_\_\_\_\_

\_\_\_\_\_  
(SIGNATURE)

Add any special billing instructions here:  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



financial support of its universities. This is a simple and direct fiscal process. But also in Russia public opinion is what the Kremlin says it is. Need I say more?

The National Science Foundation is limited by law to the support of basic research. Support of applied research is presumed to be the responsibility of those government agencies concerned with the applications. By executive order these agencies are also assigned responsibility for supporting research basic to their missions. It is in this context that the Engineering Sciences Program of the Foundation must be viewed. It has been growing in magnitude and in relation to the other programs of the Foundation. Its significance to the profession should be growing faster than its size. Its rate of growth will be determined by the vision, boldness, and drive of the research programs developing at our engineering schools and the degree to which they have as their objective the filling of the basic science pool and the success with which they exploit the pool in extracting from it possibilities for applications. It is important to engineering that in the years ahead the pool of basic science information shall become greatly enlarged as the result of vigorous basic research activity.

What has been said may be summed up as follows. Support of basic research with public money is justified because such research yields basic science information some of which leads to practical applications. These in turn lead to increased industrial activity which provides the new jobs needed by the additions to the labor force. The extent to which appropriations will be made for basic research support will depend upon public understanding of the validity of this relationship. In promoting this understanding the universities have a considerable opportunity and responsibility. The primary concern of the National Science Foundation with increasing the pool of basic knowledge was discussed and the difference of this objective from the support of education was pointed out. Finally, the dual role of the engineering sciences in making both contributions to and withdrawals from the pool of basic science was pointed out. To the extent that these relationships are understood at the universities and from the basis of their planning the engineering sciences will be in good shape to blast off into a glorious future.

## Low Energy Particles Have Important Role

In studies of matter, particles with energies of millions or even billions of electron volts have commanded most attention. Particles of low energy, however, have an important role to play in fundamental investigations of atomic structure.

To facilitate studies sponsored by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Va., the Stanford Research Institute of Menlo Park, California, has developed a low energy electron accelerator capable of producing a defined electron beam adjustable to energies from a fraction of an electron volt to several hundred electron volts. The difficulty of controlling such low energy beams makes it necessary to compensate for the earth's magnetic field and to screen the apparatus from external electrical signals, which might cause trouble.

In a current study, a small crystal of alpha lead-azide is placed in the vacuum of the accelerator and bombarded by the electron beam. Interactions between the electron beam and the surface of the crystal are recorded as an electrical current. When sufficient data have been collected, they will be compared with similar data for the interactions of photons, or light, through the crystal. The comparison will indicate whether the

slow electrons "see" the crystal structure or the individual molecules of the crystal.

With modifications, this apparatus could be used to study problems of immediate practical importance such as surface effects believed to shorten vacuum-tube life, and aging characteristics of semi-conductor surfaces. In addition, atomic and molecular collisions with electrons, important in gas discharges, atmospheric physics, and radio wave propagation, could be studied.

## Tunneling Record

A world tunneling record has been claimed by a contractor on a 44-mile New York Tunnel, according to *Engineering News-Record*. The new mark is 83 feet a day, averaged over a week. The previous was 80 feet a day at Scotland's Glen Almond Tunnel.

## Force of Wind

Russian scientists say they have succeeded in utilizing the accumulated force of the winds, *Product Engineering* reports. A wind-electrical power station has been set up for the storage of wind energy. Storing wind energy will help solve the problem of obtaining electric power where there is no fuel for thermal power stations or large rivers which could make hydropower stations.

## Contracting & Material Company

**Engineers and Contractors**



**1235 Dodge Ave., Evanston, Ill.**

**ROgers Park 4-1295**

**GRreenleaf 5-6960**



## New Products

As described by their Manufacturers

### Gate Valve

A new leakproof gate valve which incorporates Teflon seals in the wedge has been placed on the market by Hamer Valves, Inc. of Long Beach, California.

Trade-named the "Wedge-Seal" by the manufacturer, this new valve marks a radical departure from conventional gate valves. As the wedge is lowered in the new Hamer valve to a precision metal-to-metal fit against the seats, the Teflon seals on either side of the wedge compress against the seats to form a double sealing action. This double sealing action, states Hamer Valves, enables the new "Wedge-Seal" valve to provide a positive shutoff both upstream and downstream, eliminating the need for a double block and bleed in piping installations.

In addition to its excellent sealing action, the "Wedge-Seal" is extremely practical to service with the valve in the line. Eventual seal replacement is simple to accomplish.

The new Hamer "Wedge-Seal" is available in both 150 and 300 lb. classes. Remote control "Wedge-Seal" valves are also available. For literature write *Midwest Engineer*, Key 801.

### Conveyor

Newest conveyor utilizing permanent non-electric magnets for movement of small ferrous materials has been introduced by Bosworth Manufacturing Company, 34250 Mills Road, Avon, Ohio.

The unit, available either for permanent, semi-portable or portable installations, is available in 4, 5, or 6 foot heights and is adjustable from 60 to 90 degrees.

In revealing the specifications of the new "small parts" conveyor, Glen Mooney, president of Bosworth Manufacturing Company, stated that the all steel conveyor has a six-inch-wide rubber or oil resistant belt depending upon requirements. Three-ply 28 oz. rough surface belting is normally used without cleats. However, a smooth cleated 2-ply 28 oz. belt is also available.

This new conveyor, designed to take very little floor space, utilizes a special magnetic transition bed at the top of

the conveyor permitting parts to be carried over the curve even at a 90 degree elevation. It easily handles all ferrous objects, scrap, stampings, machined parts, nuts, bolts, caps and similar objects without need for guard rails.

Bosworth Manufacturing Company also produces Conveyalls, Drag Chain Conveyors, Coal Conveyors, Bin Veyors, Bucket Elevators, larger magnetic conveyors and will custom engineer and fabricate special conveyors.

### Titration Base

A new polyethylene titration base, adaptable to all sizes of standard ring stands, has been recently developed by American Agile Corporation, Maple Heights (Cleveland), Ohio. An important advantage of this new titration base is its portability, which allows it to be used in conjunction with any existing ring stand, and also provides for maximum ease of cleaning.

The polyethylene titration base, is large enough in surface working area to provide ample space for beakers, glass, titration indicators, and other accessory equipment.

It is provided with a lip around the entire top surface of the tray, to prevent spillage of corrosive reagents, and pigmented white to furnish a background conducive to maximum ease of endpoint determination.

In addition to being completely corrosion resistant, even to hydrofluoric acid and strong caustics, which may

attack porcelain bases, it furnishes outstanding resistance to fracture and chipping. The surface of the polyethylene, which is more resilient than that of porcelain, also tends to reduce breakage of glass equipment which may be bumped accidentally against the base.

Further information on this new polyethylene base may be obtained by writing *Midwest Engineer*, Key 802.

### A.C. Motor

A new weatherproof a-c. motor for use in "outdoor" type applications where the motor is subjected to extreme moisture or the elements is now available from Reliance Electric and Engineering Company, Cleveland, in all standard speeds in sizes from one through 250 horsepower.

The new weatherproof motor is engineered throughout to meet the punishment of adverse operating conditions. An open motor that exceeds NEMA splash-proof requirements, all of its external parts are of corrosion-proof cast iron. Shaft openings are sealed by a shaft cap and slinger.

The insulation system is completely non-hygroscopic (it can't absorb water). It features silicone sleeving, glass-mica slot liners and glass mat top-sticks and mid-sticks. The heavy formvar wire coils are repeatedly immersed in special thermosetting, oil-and-water-resistant varnish, then sealed with a final coat of special red finishing enamel.

The rotor O.D. and stator I.D. are coated with a rust inhibitor. A special non-washing grease is used in the Reliance "Metermatic" bearings, which meter in just the right amount of grease from the large reservoirs as needed.

The watertight conduit box is cast iron with a gasketed cover and threaded

## FRED L. NELSON OF DAYTON, OHIO

### Line Clearance for Public Utilities

Home office —  
1014 Gem City Savings Bldg.  
Dayton 2, Ohio

Illinois office —  
1226 Black Road  
Joliet, Illinois

ORIGINATORS OF DROP CROTCH AND LATERAL METHOD OF TRIMMING

outlet. Zinc-plated, non-corrosive hex-head bolts are used throughout the weatherproof motor. The stainless steel nameplate keeps motor information permanently accessible; a quick wipe with a rag makes vital specifications legible after months of rugged outdoor service.

Protective screening for ventilating openings to keep out rodents and snakes is available on request at no additional cost.

Complete engineering specifications and prices may be obtained by writing *Midwest Engineer*, Key 803.

#### Back-up Flange

A new two-piece removable back-up flange that slips over the pipe after stub ends are welded in place eliminates the necessity of handling the combined weight of pipe and flanges during fabrication, installation and maintenance of Van Stone piping systems.

Introduced by Farwell Metal Fabricating of St. Paul, Minnesota, the Marzolf Laminated Flange is made of steel or stainless segments welded into single units. End leaves of the two halves interlock and, when bolted in place, make a positive connection that is stronger yet lighter than is possible with cast iron or forged steel flanges.

With the Marzolf flange, fabrication, installation and maintenance time are greatly reduced. In pipe line fabrication, the flanges are never in the way while stub ends are welded on. During installation, crews do not have to carry or lift the combined weight of pipe and flanges while putting pipe sections into place. Easier, safer take-down simplifies cleaning pipe lines and other maintenance and repairs.

The new flange is built to A.S.A. specifications for Van Stone flanges at 150 pounds service and is available in 2 inch through 30 inch tube and pipe sizes.

A miniature sample of the new flange, a new Flange and Fitting catalog and a new Facilities Brochure, explaining the plant's other precision metal fabricating services and equipment, are available. Write *Midwest Engineer*, Key 804.

#### Nutsche

A polyethylene-lined Nutsche filter and polyethylene-coated filter screen is another example of the facilities of the American Agile Corporation to provide corrosion-resistant coatings and linings to metallic equipment used for handling acid and corrosive media.

The formed and welded polyethylene-lined filter is 44" in diameter x 6" deep. The flanged filtration screen is made of stainless steel which has been coated with polyethylene.

Additional information may be obtained by writing *Midwest Engineer*, Key 805.

#### Washer Terminals

Seven new lock washer terminals are being introduced by Zierick Manufacturing Corp., who carry a vast variety of electrical parts of all types in stock. The new lock washer terminals are also available from stock for immediate shipment.

The new terminals are manufactured by Zierick from .018 Brass or Phosphor Bronze, hot tinned, with #4, #6 and #8 holes. The shapes are designed to fit almost every need. Exact dimensions illustrated with schematic drawings are given on a new catalog sheet, which fits into their overall catalog of lugs, clips, terminals, metal stampings, wire forms, etc. Samples kit of complete set of the new lock washer terminals may be had for the asking.

To obtain samples kit, new catalog sheet on the lock washer terminals or Zierick's complete catalog of electrical parts, write *Midwest Engineer*, Key 806.

#### Boilers

A completely new line of Compak forced draft water tube package boilers has been announced by the International Boiler Works Company.

These fully automatic oil/gas fired boilers feature a forced draft burner which eliminates the need for elaborate controls, an unsightly stack or an induced draft fan. Water tube construction coupled with multi-pass design

assures rapid steam or hot water generation, and guaranteed 81% thermal efficiency.

Full access is provided to both the fireside and waterside of all tubes without dismantling the boiler. The sweeping action of hot gases over the outer surface of the water tubes makes the boiler virtually self-cleaning.

Large furnace volume provides a primary or radiant heating surface more than twice as great as found in modified scotch firetube boilers.

International Compak package boilers are available for low or high pressure hot water or steam generation in capacities to 100 HP. Sizes to 600 HP will be announced soon.

For descriptive literature and specifications on the Compak series of forced draft water tube package boilers, write to *Midwest Engineer*, Key 807.

#### Literature

A new catalog, illustrating and describing its line of semi-finished polyethylene components in branch and linear polyethylene and polyvinyl chloride, has just been published by the American Agile Corporation, Maple Heights (Cleveland), Ohio.

Specified in the free literature are sheet, rod, block and bars.

Many of the semi-finished components are illustrated, and a complete range of sizes and weights for all components is likewise included.

Of particular importance, the literature points out, is that all components listed are carried in stock and are available for immediate shipment.

Copies of the catalog may be obtained from the American Agile Corporation, P. O. Box 168, Bedford, Ohio.

## MIDWEST FORESTRY CORPORATION

### *Line Clearing for Better Public Relations*

Post Office Box 409

Muncie, Indiana

# Building Attains its Objectives

The pace-setting new mid-Manhattan headquarters building of Deering-Milliken & Co., Inc.—93-year-old pioneer in the textile industry—represents the successful attainment of two major design objectives: 1. The erection of a modern office building, timeless in design, that characterizes the creativity and fashion leadership of the company; and 2. Provision of maximum flexibility of space arrangement—utilizing the latest word in Hauserman interior movable wall systems—in order to accommodate efficiently any future changes desired in offices and showrooms.

Designed by the New York architectural firm of Carson & Lundin, the eye-catching eight story structure occupies a 100 foot by 150 foot site on the corner of 39th Street and Avenue of the Americas. Opened July 1, 1958, it features many architectural "firsts," inside and out, to provide a warm environment for customers and other visitors as well as friendly and functional working conditions for the company's 450 personnel who formerly were spread out in four different locations.

The tree-lined building facade is sheathed by a unique glass-and-marble grid. This grid effect is achieved by a narrow spacing of the structural columns—faced with white marble—which project slightly from the windows spaced between them. The slender columns appear to soar into the air, creating the illusion of height much greater than their actual 120 feet. Interestingly, the architects specified spandrels (below-window panels) of cool grey glass. These not only harmonize pleasingly in color with the clear plate window glass but

also provide a more uniform light-reflecting value for the building front than would be the case with metal spandrels.

The marble motif is carried through and emphasized on the north and south exterior walls which are sweeping 10,000 sq. ft. expanses of white marble slabs patterned to convey a feeling of a veneer rather than a heavy, thick wall.

The 15-foot tall first floor exterior of the Milliken Building is imaginatively faced with black granite which is traversed by accent strips of stainless steel every six inches. This bold design, in effect, acts as a handsome pedestal for the rest of the building.

## Eye-Catching Interior

The interior, designed by the internationally-known firm of Knoll Associates, also features unusual architectural innovations including custom-made office furniture and fabric display units. It also enjoys the most advanced system of prefabricated movable interior walls. The Knoll Planning Unit is credited with custom-designing these movable interior walls. This achievement was accomplished by utilizing the design flexibility inherent in the new Horizon movable wall system which was developed and manufactured by the E. F. Hauserman Co., Cleveland.

The new system of prefabricated movable walls was used to compose custom-styled offices and showrooms along the perimeters of the second and third floors. These are selling floors where Milliken's fashion authorities can show, and take orders for, the countless different types of fabrics manufactured by the textile mills, selling through this established house.

Since the textile industry is in a state of rapid technological advancement, it cannot be known now when certain departments will have to be increased or decreased in size, or when new departments will have to be created. According to Deering-Milliken, this is one reason why movable walls, as opposed to "fixed" plaster and lath walls were chosen, for they will permit the practically unlimited flexibility of space arrangement that is vital to the firm's operation.

The Deering-Milliken installation features wall panels surfaced in brilliantly-contrasting textures and colors. Horizon doors and side panels of the rooms are surfaced with matched grain cherry wood veneers; cross-run partitions are faced with natural undyed linen; and the front runs are faced with egg-shell satin-finished enamel, baked on to the steel panels.

To attach the specified coverings to masonry walls would have been a costly and troublesome job, according to the architects. The new Hauserman partitions were specified instead because, among other reasons, they are designed specifically to accommodate panels of any material, color and texture, and also allow for one material to be used on one side of the partition and an entirely different type to be used on the opposite side.

All component parts of the new Hauserman wall system are based on a four-inch module in every dimension. This measurement corresponds to the modular plan of the entire building and assures that however room size varies, all walls will match perfectly with the basic module of the ceiling sections. Of interest, the architects designed a "broad sea" of brightly illuminated ceiling to provide the effect of an open, limitless view that obviates a boxed-in office feeling. Visual access to this open expanse is permitted by means of clear glass panels that rest between the seven-foot high solid partition sections and the ceiling.

## The Building As A Stage

The building is designed so that it will be seen but not heard. All office equipment and interior building materials have been closely related and coordinated in quiet pastel colors to present a pleasing non-interfering background for the fabrics that will be displayed in the showrooms and exhibited on the customer-service and sales floor. Custom-built flexible display racks; combination dis-

## L. L. WELDY & ASSOCIATES, INC.

- **SORGEL ELECTRIC CO.**  
— Dry Type Transformers, Reactors, Load Centers
- **SPRAGUE ELECTRIC CO.**  
— Power Factor Correction Capacitors
- **ELECTRIC DISTRIBUTION PRODUCTS, INC.**  
— Plug-in & Feeder Uni-Bus
- **EMPIRE BOLTED PRESSURE CONTACT SWITCHES**
- **EEE CO.**  
— Load Break Switches, Isolators, High Voltage Cubicles
- **KYOVA FIBER PIPE CO.**  
— Fiber Duct

4201 Irving Park Road

SPring 7-8575

Chicago 41, Ill.



play and storage units; "live" separator walls of green plants between desks in the larger open center spaces; Knoll-designed office furniture and other accoutrements all have an eye-catching individuality, yet all blend harmoniously with each other.

The top four floors are devoted primarily to clerical and administrative offices with an employees' cafeteria and an executive dining room — including one luminous plastic wall — on the sixth floor. To assure flexible space arrangement in office areas, the architects again specified movable walls, this time selecting a satin-finished grey steel Hauserman partition, for its visual comfort and ease of maintenance. Here, too, the fact that provision has been made within the wall system for swift installation of electric and telephone lines was cited as decisive argument for the movable interior.

The basement is occupied by the high pressure, steam absorption air conditioning system, the electrical control equipment, the superintendent's office and ample storage space which connects to a side street loading platform via a loading chute.

Another interesting aspect of the new Milliken Building, the architects report, is a specially-developed window washing unit. To solve the thorny problem of maintaining the shiny glass-and-marble facade, Carson & Lundin designed a work rack that suspends from a traveling roof car. The car can be steered from the rack to go all around the building. When finished the rack and car are secured from the elements in Manhattan's only garage for window washing units.

Thus, inside and out, the new Deering-Milliken headquarters incorporates the most up-to-date architectural and engineering developments and is a refreshing new accent to New York's skyline.

## The Power of Music

Background music for workers is effective in increasing productivity and reducing errors, as well as minimizing lateness, quits and absences, according to *Factory Management and Maintenance*. In a test, listening to music increased mail inserters' performance eight per cent; check typers decreased their errors 38 per cent; key-punch operators increased production 18 per cent and cut errors 37 per cent.

MIDWEST ENGINEER

## ISA Conference Set for Sept. 15

About 30,000 engineers, scientists and management personnel from all over the world are expected to attend the Instrument-Automation Conference and Exhibit to be held Sept. 15-19 in Philadelphia, according to Dr. Robert Jeffries, president of the Instrument Society of America (ISA). ISA, with national headquarters in Pittsburgh, is sponsor of the annual event.

The Society, only technical group devoted to the technology of instrumentation and automatic controls—the "think machines and push buttons"—has more than 12,000 members.

Exhibit Manager Fred J. Tabery, who met recently with Dr. Jeffries and members of the program planning committee for the event, reported that over three-fourths of the exhibit space in the large Philadelphia Convention Hall has already been reserved, with many additional requests being received daily. He states that all indications point to the 1958 program being bigger and better in every way than any of its predecessors.

Plans for the five-day technical program were also announced by Dr. Jeffries.

The technical program will consist of technical sessions and workshops. Workshops will include instrument maintenance, sales engineering, data handling, control systems and computers.

A special feature of the conference will show how certain industries—aviation, chemical, petroleum, metals, nuclear, ceramics, and transportation—have made new discoveries, processes and techniques through the use of instrumentation. Each industry will have a separate session lasting in some cases

the entire day on September 17. Each session will be devoted to the particular problem of its industry and what's new in the field.

Another item ranked high for interest to all industries, according to Dr. Jeffries, is the data handling workshop. Dr. Martin L. Klein, research director, Kintel Division, Cohu Electronics, who is chairman of the workshop, emphasizes that this year's sessions are on subjects which have proven appeal for conferees. Selecting those which were most popular according to last year's attendance records, Dr. Klein announces nine sessions for the 1958 Data Handling Workshop.

These are: wind tunnels, flight propulsion, process industries, power generation, oscillographic and photopanel data, data transmission and storage, analog-digital converters, real-time computer applications and transducers.

How to maintain and get full performance from instruments will bring experts on the subject from Moore Products Company, American Viscose Corporation, Minneapolis-Honeywell Regulator Company, Leeds and Northrup Company and Fairless Steel Works. These experts will hold the Instrument Maintenance Clinic on Sunday, September 14, and all day on Monday, September 15, opening day of the 5-day exhibit.

## Antiseptic Coating

A long-lasting antiseptic plastic coating material has been introduced by a Connecticut chemical company, reports *Chemical Week*. The semipermanent germicidal coating is dipped, sprayed or brushed on.

## GILBERT-HODGMAN, INC.

Electrical Engineers and Contractors

1625 West 75th Place

Chicago 20, Illinois

Members W.S.E. and A.I.E.E.

# Professional Directory

## SARGENT & LUNDY

ENGINEERS

140 S. DEARBORN STREET

CHICAGO, ILLINOIS

## E. R. GRITSCHKE

and

## ASSOCIATES, Incorporated

Consulting Engineers

Designers of  
MECHANICAL and ELECTRICAL SYSTEMS  
for BUILDINGS

11 S. LaSalle St., Chicago 3, Ill.

## TAND SURVEYS

INDUSTRIAL • COMMERCIAL • RESIDENTIAL



LEGAL DESCRIPTIONS  
PROPERTY LINES —  
RIGHT OF WAYS —  
SUBDIVISIONS —  
TOPOGRAPHY —  
CONSTRUCTION  
LINES—GRADES  
S. PASQUINELLI  
REG. ILL. IND. WISC.

NATIONAL SURVEY SERVICE, INC.  
Registered Engineers and Land Surveyors  
134 NO. LA SALLE ST. • RANDOLPH 6-7608

## U. S. FIRE PROTECTION ENGINEERING SERVICE, INC.

Chicago • Kansas City • San Francisco

Specialists in —  
FIRE • Control Construction  
• Prevention Methods  
• Protection Equipment

## CONSULTANTS — DESIGNERS

Chicago Office — 53 W. Jackson Blvd.  
Tel. WEBster 9-3358

## SOIL TESTING SERVICES, Inc.

Consulting Engineers

John P. Gnaedinger  
Carl A. Metz  
Clyde N. Baker, Jr.  
C. J. Aimi

Soil Investigations,  
Foundation Recommendations and Design,  
Laboratory Testing

1827 N. Harlem Avenue, Chicago 35, Illinois  
Milwaukee, Wisconsin - Portland, Michigan  
Kenilworth, N. J. - San Francisco, California  
Havana, Cuba

## Henry L. Hoepfner

Electrical Engineer

Generation  
Transmission  
Distribution

211 Imperial St.  
Park Ridge, Ill.  
Tel. TALcott 3-4288

## DE LEUW, CATHAR & COMPANY

CONSULTING ENGINEERS

Public Transit	Subways
Traffic & Parking	Railroad Facilities
Expressways	Industrial Plants
Grade Separations	Municipal Works
Urban Renewal	Port Development

150 North Wacker Drive, Chicago 6

San Francisco Toronto Oklahoma City

## ROBERT W. HUNT COMPANY ENGINEERS

Inspection • Tests  
Consultation

Engineering Materials

Cement • Concrete • Chemical  
Physical and Metallurgical  
Laboratories

810 S. Clinton St., CHICAGO 7. And All Large Cities

## SILAS CARTLAND P.E.

Consulting Engineer

Designer

Air Conditioning  
Mechanical & Electrical  
Systems for Buildings

911 Busse Hiway, Park Ridge  
Ta 3-1300

## JENKINS, MERCHANT & NANKIVIL

Consulting Engineers

Municipal Improvements	Sewerage
Power Development	Water Systems
Traffic Surveys	Industrial Plants
Flood Control	Recreational Facilities
Airports	Investigations and Reports

805 East Miller Street  
Springfield, Illinois

ESTABLISHED 1913

## WALTER H. FLOOD & CO.

CHEMICAL ENGINEERS

Inspection and Testing  
Of Materials and Structures

Buildings, Roads, Streets, Airports

SUPERVISION OF CONSTRUCTION

CONCRETE CORE CUTTING

6102 S. BLACKSTONE AVE. CHICAGO 37

Branch—1332-4 N. Westnedge Ave.

Kalamazoo 53, Mich.

**Your Card\* on this or the opposite page will  
acquaint others with your specialized practice.**

\* Restricted to Professional Architects and Engineers



# Cartographic Device Developed

A cartographic grid-ruling instrument capable of producing rectangular grids of high accuracy, and suitable for field use in compiling maps has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia.

Now undergoing service tests, this instrument is designed to decrease the time required for drafting rectangular map grids while increasing the accuracy of constructed grids.

Simplicity of design and operation is featured to achieve a reduction in the levels of skill and experience required of personnel employed in the drafting phase of mapping.

The grid-ruler can be assembled and disassembled by one operator, although it is more easily accomplished by two because of the weight of the main beam. The beam weighs approximately 50 pounds and the combined weight of the grid-ruler and carrying case is approximately 120 pounds.

Cast from high strength aluminum, the beam is 61 inches long and four stainless steel inserts, running the full length of the beam, serve as bearing surfaces and tracks on which the carriages roll. The carriages act as both pivot points for the links and as housings for the indexing verniers. Each carriage rolls on eight pre-loaded, precision ball bearings, four of which are mounted in eccentrics for adjustment to insure equalization of load. A knurled wheel, fastened in the side of each housing and bearing against the beam, acts as a slow motion device for setting the indexing vernier. Two flat, stainless steel scales, either of which can be securely clamped to the top of the beam, are supplied with the grid-ruler. Both edges of each side of the scales are graduated to permit direct selection and setting for grid line spacings.

Adjustable verniers furnished with the instrument can be mounted on the carriages to permit a least reading of 0.010 inch and 0.10mm on these two scales. Plates identical to these verniers, but bearing only one indexing mark, were supplied for use with the common mapping scales.

The marking tip of each device is held in a ground or highly finished cylinder that is made to fit with very close tolerances in the ball bushing pressed into the end of the longer link. These cylin-

ders move freely with very little frictional restraint in the vertical plane, thereby compensating for drafting surface irregularities or a warped table top.

End mounts serve as a means for clamping the beam securely to a drafting table and also for aligning the beam with grid reference lines. The upper section may be rotated 360° with respect to the lower section, and a slow motion screw incorporated in it allows each end of the beam to be precisely shifted during the aligning procedure.

A six-power microscope containing crosshairs and mounted on one of the rolling carriages facilitates the erection of perpendicular grid lines.

All metal parts of the grid-ruler, ex-

cept the ball bearings and commercial socket screws, are either corrosion-resisting stainless steel or aluminum. The only non-metallic parts of the instrument are the glass optics in the aligning microscope. The carrying case is weatherproof plywood.

A grid 25 x 51 inches can be drafted, without the necessity of reversing the positions of the links, by starting operations with the fixed carriage at its extreme end position on the beam and working towards the center. If the links are reversed at the center of the beam and construction continued to the opposite end of the beam, a grid 50 x 51 inches can be drafted.

The instrument was built under contract to the Laboratories by the Union Instrument Corporation, Plainfield, New Jersey.



At the receiver, above, an operator converses freely across the miles by radio-phone. The receiver is almost identical to the transmitter, and all the engineer does to operate it is flip switches. Highway departments and consulting engineers are using the portable, light-weight radar device to establish control points for the new superhighways in the 41,000-mile National Interstate System.

Out of sight . . . engineers using the new electronic "tellurometer" system of measuring distance can be miles apart and out of sight of each other. At right, a highway surveyor is operating the small radar transmitter, sending microwaves to a distant receiver and taking the readings. The time it takes the radar waves to make the round trip registers on the instrument in micro-milliseconds, which, in turn, are quickly translated into miles, feet, and inches. The tellurometer technique is amazingly fast. Engineers can measure distances in 10 minutes that would take several days by traditional triangulation or taping. The accuracy is more than satisfactory, with a maximum error of only 11 inches in 40 miles.

## Highway Surveyors turn to Electronics

Photos by Highway Information Services



# Professional Directory

**Chas. W. Cole & Son**  
Engineers & Architects  
South Bend, Indiana

## HAZELET & ERDAL

*Consulting Engineers*  
Bridges — Foundations  
Expressways — Dams — Reports  
**Monadnock Block**  
Chicago  
403 Commerce Bldg., Louisville  
Dixie Terminal Bldg., Cincinnati  
Oding Bldg., Lansing

## CONSOER, TOWNSEND & ASSOCIATES

Water Supply, Sewerage, Flood Control and Drainage, Bridges, Express Highways, Paving, Power Plants, Appraisals, Reports, Traffic Studies, Airports, Gas and Electric Transmission Lines

360 East Grand Ave., Chicago 11, Ill.  
9½ Indiana St., Greencastle, Ind.

## Batthey & Childs

**ENGINEERS**  
231 So. LaSalle Street  
Chicago 4, Ill.

INDUSTRIAL PLANTS  
POWER PLANTS  
REPORTS

DESIGN

SUPERVISION

## JOHN F. PARMER

Engineers

Designing  
Consulting  
Investigations  
Reports  
Supervision

Structural System  
Industrial Bldgs.  
Foundations  
Pavement  
Bridges

173 W. Madison St.

Chicago 2

Franklin 2-4198

## A. A. Lipsey & Associates ENGINEERS

Structural Design  
Industrial Buildings  
Commercial Buildings  
Foundations  
Investigation  
Reports — Appraisals

21 E. BELLEVUE CHICAGO 11  
Whitehall 4-3298

## Alvord, Burdick & Howson

ENGINEERS FOR

Water Works, Water Purification, Flood Relief,  
Sewerage, Sewage Disposal, Drainage,  
Appraisals, Power Generation

20 N. Wacker Drive • Chicago 6

Telephone: Central 6-9147

## LESTER B. KNIGHT & ASSOCIATES, Inc.



- Management Engineering
- Industrial Engineering
- Plant Engineering

CHICAGO NEW YORK WASHINGTON, D. C.

## GREELEY AND HANSEN

ENGINEERS

Water Supply, Water Purification  
Sewerage, Sewage Treatment  
Flood Control, Drainage, Refuse Disposal  
220 S. STATE STREET, CHICAGO 4

## ROBERT S. MAYO Civil Engineer—M.-W.S.E.



Tunnel and Mine  
Engineering and  
Equipment Design

Lancaster, Pennsylvania

## VERN E. ALDEN CO. Engineers

Design and Supervision  
of Construction

Industrial and Chemical Plants  
Steam Power Plants

33 North LaSalle St.  
Chicago 2

## STANLEY ENGINEERING COMPANY

*Consulting Engineers*

Hershey Building  
Muscatine, Ia.

208 S. LaSalle St.  
Chicago 4, Ill.

**Your Card\* on this or the opposite page will  
acquaint others with your specialized practice.**

\* Restricted to Professional Architects and Engineers

# Highway Toll Schedule Adopted

The official schedule of tolls for Illinois' new 187-mile tollway was adopted in Chicago on July 14 by the Illinois State Toll Highway Commission.

Charles L. Dearing, executive director of the commission, said that the toll schedules adopted are substantially the same as those recommended by a traffic and earnings report prepared early in 1958 and announced by the commission last March.

"Under the schedule of tolls, passenger cars and light trucks will be charged approximately two cents per mile," Dearing said. "Charges for heavier vehicles range from two and one-half cents per mile for busses and medium trucks to six cents per mile for vehicles with five or more axles."

The traffic and earnings report on which the tolls are based estimates total gross earnings of \$23,600,000 for 1959. This is expected to rise to \$47,200,000 during the tenth year of operation with an annual average for the first ten years of \$37,420,000.

"Passenger cars and light trucks are expected to account for 87.6 per cent of the total traffic and pay 78.7 per cent of the tolls," Dearing said. "The larger trucks will constitute 12.4 per cent of the traffic stream and make up 21.3 per cent of the estimated tolls."

Scheduled for opening first was the 76-mile Northwest Tollway from O'Hare Airport to South Beloit on August 20. This was followed on August 27 by the opening of the 30-mile section of the Tri-State Tollway from a direct connection with Edens Expressway north to the Wisconsin state line. The remainder of the tollway will be opened by Jan. 1, 1959.

On that portion of the Northwest Tollway west of the Fox River, a distance of about 52 miles, tolls will be collected under a "closed" system where the driver receives a ticket upon entering the tollway and pays when leaving according to the distance traveled. Toll collection on the remainder of the 187-mile tollway is based on an "open" system by which tolls are collected at barriers across the roadway at various intervals.

Tolls for typical passenger car trips are: Chicago to Elgin via Northwest Tollway—\$0.30; Chicago to South Beloit via Northwest Tollway—\$1.35;

Chicago to Aurora via East-West Tollway—\$0.30; Wisconsin line to Edens Expressway via Tri-State Tollway—\$0.60; Entire length of Tri-State Tollway—\$1.80.

"Our financing program contemplated that the first revenues would begin on Jan. 1, 1959," Dearing said. "Our principal reason for opening in advance of that schedule is to give our administrative staff, toll collectors and tollway police detachment valuable operating experience before opening the entire system."

## ILLINOIS TOLLWAY TOLL SCHEDULES OPEN SYSTEM

Vehicle Class	Main-Line Toll Barrier	Ramp Toll Barrier*
1	30¢	10¢*
2	40¢	15¢*
3-9	50¢	25¢*

\*These tolls apply to the mail-line toll barrier west of Farnsworth Avenue interchange near Aurora.

## CLOSED SYSTEM

Vehicle Class	Approximate Cost Per Mile
1	2.0¢
2	2.5¢
3	3.0¢
4	4.5¢
5-9	6.0¢

## VEHICLE CLASSES

Class 1 — Automobile, motorcycle, taxi, station wagon, ambulance, single unit truck or tractor. (2 axles, 4 tires.)

Class 2—Single unit truck or tractor, busses. (2 axles, 6 tires.)

Class 3—Trucks and busses with 3 axles.

Class 4—Trucks with 4 axles.

Class 5—Trucks with 5 axles.

Class 6—Trucks with 6 axles.

Class 7—Class 1 vehicle with one-axle trailer, including house trailer and boat trailer.

Class 8—Class 1 vehicle with two-axle trailer, including house trailer and light hauling trailer.

Class 9—Special or unusual vehicles. Any not classified above. Includes Class 2 vehicles with two-axle house trailer.

## Set December Date For Power Exposition

More than 200 manufacturers of power and allied equipment have contracted for space in the 23rd National Exposition of Power and Mechanical Engineering. The Exposition will be held at the New York Coliseum, next December 1 to 5, and the heavy volume of early commitments represents a massive investment in the potential market.

As heretofore, the display will be staged under the auspices of The American Society of Mechanical Engineers.

A feature of this year's display will be a number of exhibits of heavy equipment, built to customer specifications. One will be possibly the heaviest single piece of apparatus ever on view at one of these shows. It is a giant feedwater heater, made in California for a power plant in New England, weighing 36,000 pounds. Like other special exhibits, it will involve special problems in transportation and installation. Another innovation will be the first packaged water tube boiler seen at a power show.

Announcement has been made of the Advisory Committee for the current Exposition with Joseph Pope as chairman and John H. Lawrence vice chairman.

## The Haines Company

Ventilation & Air Conditioning Contractors

Sheet Metal Fabricators

— Welding —

1931 WEST LAKE STREET

CHICAGO 12, ILLINOIS

SE eley 3-2765



## Engineering Societies Personnel Service, Inc.

Est. 1918

Chicago  
84 E. Randolph St.,  
ST 2-2748

Detroit  
100 Farnsworth Ave.,  
TE 3-1090

New York  
8 W. 40th St.,  
WI 7-5878

San Francisco  
57 Post Street  
SU 1-5720

*The following items are furnished by the Engineering Societies Personnel Service, Inc., a non-profit, self supporting, personnel service sponsored by W.S.E., A.I.E.E., A.I.M.E., A.S.C.E., A.S.M.E., S.N.A.M.E., E.S.D., E.C.S.F. Replies should be addressed to the nearest office.*

*Members of the societies shown above may publish a free advertisement on this page by registering at the nearest E.S.P.S. office. A weekly bulletin of Positions Open is available by subscription at \$3.50 a quarter for members and \$4.50 a quarter for non-members.*

**PLACEMENT FEES:** *The service is operated on a co-operative basis, whereby those actually placed in positions by the Service pay a fee in accordance with the established placement fee rates, which is 4% of the annual salary to members and 5% of the annual salary to non-members. HOWEVER MANY EMPLOYERS EITHER PAY FULL PLACEMENT FEE OR NEGOTIATE FEES.*

### Positions Available

C-6936 BLDG. PROJECT ENGR. GRAD. MECH. or Arch. age to 40; 5+ yrs. exper. in bldg. design & construction. Duties: To supv. bldg. alteration dept. of large loop bldg. carrying on extensive remodeling program involving air conditioning, elevators, mech. & elect. facilities. Good viewpoint on appearance on work involved. Must have unusual personality for tenant & officer contact. Able to handle alterations, letting of contracts, supv. of installations, etc. sal. \$10,000+ loc. Chgo., employer might negotiate the fee.

C-6942 MACHINE DESIGNER Mech. Engrg. 5+ yrs. exper. in design & devel. of industrial staple driving machines, wire stitchers, industrial sewing machines or metal fastening devices such as air tackers. Good potential to advance to position of chief engr. Ability to work on own initiative sal. up to \$12,000 dep. on exper. loc. Southern Ill.

C-6943 METALLURGIST IN FERROUS WIRE PROCESSING Grad. Met. Engr. 5+ yrs. in a wire mill, drawing & finishing low carbon wire. Able to set up quality controls standards & production controls. Broad opportunity for advancement, sal. open, loc. Southern Ill.

C-6945 PROJECT ENGR. BSME or BSEE age 30-45; 5 yrs. exper. in consumer products (cameras, tape recorder, radio) knowl. of electronics & acoustics helpful. Duties: Carry hearing aid & audiometer designs from original specifications to finished product sal. \$8-12,000 loc. Chgo. employer will pay the fee.

C-6948 SALES ENGR. SANITARY BS in San. or CE age 35-50; 5+ yrs. in sanitary engrg. design, const. & sales. Duties: High level sales management for mfrg. of sanitary sewage & waste

treatment plant eqpt. Must have demonstrated sales record in sanitary field 25% travel for a mfrgr. sal. \$10,000+ dep. on ability Chgo. Hdqrs. employer will negotiate the fee.

C-6950 SALES ENGR. Grad. Mech. age 32-35; 3+ yrs. in sales of capital goods. Duties: Sales-to supervise group of salesmen, attend convention, contact district sales engrs. selling material handling & grain drying mach'y. sal. \$7000+ loc. Chgo. employer will negotiate the fee.

C-6951 (A) SOILS ENGR. Grad. CE-soils option age to 40; 3+ yrs. in highway or airfield pavement. Duties: To contact highway depts., federal agencies & consultants involved in pavement design & const. travel thruout U.S. (B) HIGHWAY PLANNING & ADM. ENGR. Grad. CE exper. in highway economics, planning & admin. in state in highway dept. of U.S. Bureau of Roads. Duties: To contact highway engrs. of state, county, city highway & street depts. & consulting engrs. involved in highway design travel thruout U.S. (C) METROPOLITAN ENGR. Grad. CE-city planning option, know city planning, urban transportation, urban redevelopment & expressway design. Will contact city engrs. & city officials on problems related to urban planning, travel thruout U.S. salaries open Chgo. Hdqrs. employer will pay the fee.

C-6952 DESIGN & DEVELOPMENT ENGR. Grad. Mech. 3+ yrs. in design & development of small electro-mech. devices, preferably temperature controls. All design & devel. work on controls. Very little board work for a mfrgr. sal. open loc. N.W. Chgo. suburb, employer will pay the fee.

C-6953 SALES ENGR. Grad. Elect. age

28+; 2-5 yrs. in electronics field, i.e., communications broadcasting, CAA, etc. Duties: Contacting utilities, Gov't. agencies police & fire depts. & large corporations handling special purpose recording machines. Ability to contact top level personnel on tech. & policy wise basis, sal. \$7000+ loc. Chgo.

C-6955 HEAD-CONSTRUCTION MATERIALS TEST DEPT. BS age to 40; know soils mechanics. Duties: Compilation of soil, bituminous & cement/concrete testing eqpt. catalog; location of suppliers of such eqpt.; sales (mail-order & personal contact) for a supplier of scientific eqpt. sal. \$6-9000 dep. on ability & exper. loc. Chgo. employer will negotiate the fee.

### Engineers Available

900-MW: RECENT GRADUATE Purdue Univ. BSME Draft exempt interested in process & development engrg.

901-MW: SUPT. OF ELECT. MUNICIPAL UTILITIES 37 BSEE abt. 1 yr. Asst. Supt. Elect. Utilities for No. Shore suburb, prev. in power as distribution engr. private utilities & layout of elect. power & lighting for private industry \$7200 Chgo. area.

892-MW: ASSOC. PROFESSOR or PROFESSOR 48 BS & MSEE 14 yrs. industrial exper. in design 8 yrs. teaching courses in elements of EE, circuits, measurements & rotating machinery.

888-MW: JR. ENGR. 24 BSCE 1 yr. exper. highway engrg. mainly proportioning engr. & paving inspector on concrete paving jobs. Registered "Engr.-in-training" in Ill. Pilot with USAF 21½ yrs. comm. pilots license \$5400 Midwest.

881-MW: EXEC. ASST., OPER. SUPV. ENGRG. SALES 48 BSME Diversified ind. engrg. exper. considerable contacts exper. from foreman thru supt. levels \$8400 Chgo. & Suburbs.



# Puerto Rico Breaks Ground

Dr. Milton S. Eisenhower, personal representative of the President of the United States, was the principal speaker in ground-breaking ceremonies July 26, at Mayaguez, Puerto Rico, to mark the beginning of construction of major facilities for the Atomic Energy Commission's Puerto Rico Nuclear Center.

Also participating was Commissioner John S. Graham of the Atomic Energy Commission and other government and University of Puerto Rico officials.

Dr. Eisenhower first proposed on Sept. 17, 1956, at a meeting of the Inter-American Committee of Presidential Representatives, that a nuclear center be established at the University of Puerto Rico to enable that university to offer training and education in nuclear energy in the Spanish language.

The research reactor and laboratory facilities of the Center are to be located adjacent to the Mayaguez Campus of the University of Puerto Rico, which operates the Center for the Commission.

Because of the close association of general engineering with nuclear engineering and other atomic energy programs, the ceremony was held at the new Engineering Building of the College of Agriculture and Mechanical Arts at Mayaguez. A signal activated by nuclear energy started the excavation at the Nuclear Center site nearby.

Also participating in the ground-breaking ceremonies was Dr. Jaime Benitez, chancellor of the University of Puerto Rico and S. R. Savirie, manager of the AEC's Oak Ridge Operations Office.

The Puerto Rico Nuclear Center was established in 1957 to develop a comprehensive program of research and training in nuclear science and engineering and the peaceful application of nuclear energy in medicine, agriculture and industry. Instruction at the Center is in the Spanish language and the facilities are available to meet the needs of the American Republics. John I. Thomas is manager of the Commission's Puerto Rico Area Office and Dr. Carlos Bonilla is director of the Nuclear Center.

The Nuclear Center buildings at Mayaguez will be constructed by the Southern Construction Company, Inc., of Augusta, Ga., under a fixed-price contract with the Commission. The buildings were designed by Catalytic Construction Com-

pany of Philadelphia, Pa. A 1,000 kilowatt (heat) pool-type research reactor is being designed and installed at the Center by AMF Atomics of Greenwich, Conn. These facilities are expected to be completed in 1960.

## Petroleum Industry's Electrical Meet Set

More than a score of symposiums and discussions on the growing importance of electric power in the production of oil and gas, refining and transportation are scheduled for the fifth Electrical Conference of the Petroleum Industry at the Baker Hotel, Dallas, Tex., Sept. 15-17. It is sponsored by the American Institute of Electrical Engineers. D. S. Coffman, Texas Power & Light Co., Dallas, is the conference chairman and will preside at the opening general session.

Among the symposiums will be a panel discussion on batch interface detectors, with C. F. Barnard, Pipeline Engineering Co., as the moderator. Panelists will be: C. V. Baxter, Salt Lake Pipeline Co., C. W. Blackburn, Phillips Petroleum Co., R. R. Hancox, Great Lakes Pipeline Co., W. W. Holt, Jr., Plantation Pipeline Co., and R. L. Smith, Southeastern Pipeline Co.

At the general luncheon, Monday, Sept. 15, L. F. Oberhelman, Standard Oil Company of Indiana, outgoing chairman of the AIEE Committee on the Petroleum Industry, will preside.

Several sub committee meetings are planned. They include Production, with C. H. Eckel, chairman of the Sub Committee on Production, presiding; Transportation, with C. D. Catt, new chairman

of the Transportation Sub Committee, and Refining, with Lee B. Eddy, new chairman of the Refining Sub Committee, presiding.

## Illinois Institute Gets \$21,000 Grant

A \$21,000 grant awarded to Illinois Institute of Technology, Chicago, may aid in the proper handling of known explosives and lead to the development of new ones.

The one-year U. S. Army Bureau of Ordnance grant for basic research on "Crystal Studies of Explosives" will be under the direction of Dr. Leonid V. Azaroff, associate professor of metallurgical engineering.

Azaroff hopes to expand the technique of X-ray diffraction analysis of crystals to the detection of very light atoms, such as hydrogen.

This will be done by developing low-temperature equipment with which to study crystals cooled with liquid nitrogen. Extremely high accuracy can be attained by using this method, he said.

The grant is a continuation of a study Azaroff made at Armour Research Foundation, an affiliate of IIT, in which he developed a special-purpose computer to make calculations required in crystal structure determination.

Azaroff, co-author of *The Powder Method in X-Ray Crystallography*, was on the staff of Armour Research Foundation from 1953 to 1957.

Awarded a bachelor's degree cum laude from Tufts University and a Ph.D. in crystallography from Massachusetts Institute of Technology, he was a teaching assistant and a research assistant at MIT.

## Consulting Engineer

MUST HAVE TRAINING AND EXPERIENCE IN STEAM POWER PLANT AND ELECTRIC UTILITY SYSTEM PLANNING AND OPERATIONS. EXCELLENT OPPORTUNITY FOR MAN WITH ADMINISTRATIVE ABILITY. SMALL PHOTOGRAPH DESIRABLE. ALL REPLIES CONFIDENTIAL. WRITE *MIDWEST ENGINEER*, Box M.

## WSE Applications

*In accordance with Article I, Section 5 of the By-Laws of the Western Society of Engineers, there is published below a list of applicants for admission received since the last issue of the Midwest Engineer magazine.*

Donald W. Hodgman, Secretary-Treasurer, Gilbert-Hodgman, Inc., 1625 W. 75th Pl.

Gordon G. Lindquist, Assist. Dir., Safety & Traffic Engrg. Dept., 66 E. South Water St.

William W. Cramer, Engineer, Ingersoll-Rand Co., 400 W. Madison St.

Roy Skillestad, Engineer, Art Institute, Adams St. & Michigan Av.

Martin P. Aznavoorian, Chief Struct'l. Engineer, Ragnar Benson, Inc., 4744 W. Rice St.

D. K. Taylor, Assist. Vice President, Connelly, Inc., 3154 S. California Av.  
Loren Trimble, Dir. of Indust'l. Devel., Commonwealth Edison Co., 72 W. Adams St.

A. N. Eliassen, Electrical Engineer, Sargent & Lundy, 140 S. Dearborn St.  
W. Carlton Dresser, Des. & Dev. Engineer, Crane Packing Co., 6400 W. Oakton, Morton Grove, Ill.

V. Conquest, Vice President, Res'h., Armour & Co., 401 N. Wabash Av.

## Better Sled Mounted Shelters Developed

A new and improved family of sled-mounted shelters for personnel aboard tractor-drawn snow trains in frigid climates has been developed by the USA Engineer Research and Development Laboratories, Fort Belvoir, Virginia, for

the U. S. Army Transportation Corps. The Army calls these shelters Wanigans.

There are three units in the new Wanigan family: a 24-man bunk or mess unit, and a small four-man reconnaissance unit. They differ from previous Wanigans principally in the outfitting, utilities, and design details. They are equipped with the Corps of Engineers' standard hot-air heater, and in the mess Wanigan the chairs and tables fold against the wall. All of the Wanigans can be disassembled completely, or eight feet of each end of the 12 and 24-man units, containing the bulk of the equipment—heaters, snow melters, etc.—can be left intact and the center section disassembled and stored therein and in separate packages.

The large unit is 36 feet long, 10½ feet wide, 7 feet 10 inches high and weighs 10,000 pounds, less chassis and sled, when used as a bunk unit. The same unit used as a mess Wanigan weighs 11,000 pounds. The medium size unit is of the same width and height as the large unit, but is only 24 feet long and weighs 5,000 pounds, less chassis and sled, as a bunk unit, or 6,500 pounds as a mess unit. The reconnaissance Wanigan is 14 feet long, 6 feet 6 inches wide, 6 feet 10 inches high and weighs 1,500 pounds less outfitting and sled. Outfitted, it weighs 2,200 pounds and, with sled, its weight is 3,400 pounds.

The medium and large Wanigans are constructed of stress cover plywood panels 2 inches thick with ¼-inch plywood faces and fiberglass insulation in the panel cavity. The small Wanigans are made of plastic panels 2 inches thick with plastic-fiberglass cloth cover bonded to a single veneer of plywood which, in turn, is bonded to a 2-inch Styrofoam

core. This results in a lightweight panelized enclosure.

The new Wanigans will be engineering and user tested by the U. S. Army Engineer Research and Development Detachment and the U. S. Army Transportation Corps on the icecap in Greenland. The Transportation Corps Heavy Sled Company is the prime user of Wanigans as their organizational equipment.

## Army Training Reactor Operators

As the Army's first facility for training nuclear power plant operators, the Army Reactor at Fort Belvoir includes the latest features for giving the best instruction to the most trainees in the minimum time. One of these features is a closed circuit television system designed to allow a classroom full of students to observe intricate maintenance functions or radioactive equipment operation in other parts of the plant.

Designed and built by the Dage Corporation for Alco Products, Incorporated, the Atomic Energy Commission's prime contractor on the Army Package Power Reactor, the TV monitor system includes a camera pick-up which can be located inside the plant's "Vapor Container," in which the reactor and radioactive, high pressure water system is located.

During the infrequent intervals when the APPR-1 is shut down for re-fueling, the TV system will be used for trainees to observe the delicate operations required by the small, skilled maintenance crew in the restricted work space inside the "vapor container." Thus, trainees can become familiar with the procedures without distracting or interfering with the crew's operations.

Outlets are also available throughout the APPR-1 so that the pick-up camera can monitor any operation in the plant and permit large groups to observe maintenance procedures.

## Light Weight Detector Developed

A mine detector weighing only one fourth as much as the current standard model has been developed by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia, the Department of the Army has announced.

## MUNCIE CONSTRUCTION CORP.

Contractors

for

Engineering

Construction

Substations

Transmission Lines

Distribution Systems

Utility Maintenance

201½ East Adams Street

Muncie, Indiana

The seven-pound detector, designed to locate mines with metal components, is equipped with transistors instead of electron tubes. It has four times the battery life of the standard model. In addition to reducing overall weight, sensitivity has been increased and stability improved. Maintenance, always a problem in the field, has been simplified to such a degree that operators can perform major repairs.

Major weight reductions have been accomplished in the electronic assembly worn on the operator's standard military cartridge belt. This 7" x 5" x 1" unit consists of four hermetically sealed plug-in subassemblies each containing several transistors with their associated circuitry. Repairs involve merely replacing one or more of these compact, plug-in units with a spare.

The search head is mounted on a collapsible handle through which wiring connects it with the electronic and head set assembly. A control box attached to the handle contains a combined power-sensitivity switch and an indicating meter.

In operation, metal upsets the search head balance, the electronic assembly amplifying this unbalance signal for headset and meter indication.

Built by Texas Instruments, Inc., Dallas, Texas, under negotiated contract with the Laboratories, the detector has passed all engineering tests and is now ready for field testing.

## Engineering Starting Salaries Still High

Average starting pay for January and June engineering graduates at Illinois Institute of Technology, Chicago, was \$470 a month—the same as last year, according to Earl C. Kubicek, director of placement.

The 1957 electronics boom brought electrical engineering starting salaries to \$515 a month last year, he said. This year's electrical engineering average was \$470 a month.

"However, mechanical engineers, who are more basic in industrial application, commanded an average monthly salary of \$483 compared to last year's average of \$465," Kubicek added.

The over-all average, he pointed out, also included starting salaries for chemical, civil, fire protection and safety,

food, industrial, and metallurgical engineering, and mechanics graduates.

Figures, based on a 40-hour work week, do not include starting salaries of graduates whose work experience prior to graduation exceeds one year.

Neither are statistics included for graduates who did the major portion of their undergraduate work in the IIT evening division while regularly employed, ROTC students who went immediately into the armed forces, or those continuing for graduate study.

"In spite of talk of recession, depression, and layoffs, there has been no material change in industry's demand for qualified engineers holding a bachelor's degree," he said.

"Companies are becoming more and more selective," he added. "They want engineers who suit their needs—whether or not the graduates are draft exempt or in the top quarter of their class."

The market for engineers still is greater than the number of graduates, Kubicek added. He quoted a 1957 national survey made by industry which showed that a company was successful in recruiting when it secured 52 per cent of the engineering graduates it needed through college recruitment.

"However, college recruiting still remains the most effective way for American industry to secure much-needed engineering personnel," Kubicek said.

Interviews for 579 companies and government agencies were scheduled by IIT in 1958 and approximately 1,600 personal interviews were arranged between company representatives and graduates. Almost 300 companies already have confirmed recruiting dates for the coming year, Kubicek concluded.

## Northwestern Grads Start off Well, Too

Engineering students who received bachelor's degrees in June at Northwestern University received starting salaries five per cent higher than last year's class, according to Miss Frances Brown, graduate placement secretary of the University's Technological Institute.

Her report on the future plans of the 96 men who received bachelor's degrees in engineering said that the average salary accepted by 1958 graduates is \$505 per month. This compares to \$480 a year ago and \$432 in 1956.

The highest paid graduate is an industrial engineer at \$583, while the low accepted salary was \$425 in electrical and industrial engineering. Average accepted was highest in science engineering at \$550, while industrial engineering (\$511), civil engineering (\$510), electrical engineering (\$508), chemical engineering (\$500), and mechanical engineering (\$496) followed in that order.

The report also revealed that 1,517 student interviews were conducted during the Oct. 7, 1957-May 27, 1958 period.

Of the 1958 engineering class, 42 per cent plan to enter industry, while 25 per cent plan full-time graduate study. Fifteen per cent will enter the armed forces, three per cent will combine school and industry, and 15 per cent are undecided.

A sizeable decline in both number of interviews and number of job offers received was revealed by Miss Brown's statistical summary. In 1957 members of the graduating class had an average of 10 interviews and an average of six offers. During the past year, students had

## SAUERMAN BROS., INC.

**Engineers and Manufacturers**

**Drag Scrapers  
Slackline Cableways  
Scraper Storage Systems  
for Bulk Materials**

**Tautline Cableways  
Durolite Blocks  
Wire Rope & Wire  
Rope Fittings**

**620 S. 28th Ave., Bellwood, Ill.**

**Austin 7-6220  
(Chicago)**

**Linden 4-4892  
(Bellwood)**



an average of only six interviews and 1.8 job offers.

Placement of engineers holding master's or doctoral degrees during the year were topped by doctoral degrees in chemical engineering at \$675 to \$750. Highest master's degree placement was an electrical engineer at \$678.

Despite the five per cent increase in salaries paid bachelor's degree engineers, the amount of pay ranked in a tie for third among determining factors in accepting positions. Type of work was the prime factor, followed by future possibilities, salary and educational opportunities. Location was fourth, with a majority choosing the Chicago area, and other midwest locations next.

## **Aluminized Suit Protects from Fire**

An expendable aluminized suit for the protection of fire fighters and a unique emergency water supply system were used successfully in large scale first tests conducted recently in northern California forests by the U. S. Army Engineer Research and Development Laboratories, Fort Belvoir, Virginia, the Department of the Army has announced.

Preliminary reports on the tests, held to evaluate fire fighting equipment for troop use, indicate that men wearing the suit over duty uniforms were able to stand within two feet of a forest fire for two to three minutes without discomfort, although the heat was so intense that exposed portions of helmet liners were blistered.

Designed by the Engineer Laboratories and fabricated by the Quartermaster Corps, the expendable suit is made of flame retardant treated aluminized kraft paper. It consists of a parka with hood, a face mask, a pair of leg sleeves, and a pair of mittens.

Other results of the test conducted in cooperation with troops from Fort Lewis, Washington, showed the feasibility of an emergency water supply system, also designed by the Laboratories' Fire Fighting Branch. This consists of lightweight piping and hose, and an electrically-driven submersible pump.

Soldiers inexperienced in fire-fighting were able to couple 1000 feet of pipe in three and a quarter minutes and the lightweight hose was laid successfully by a helicopter flying at tree-top level.

The tests were conducted in the projected reservoir area for the new Trinity Dam in the Shasta-Trinity Alps, northwest Redding, California, with troops of Company "B," 34th Engineer Combat Battalion, Fort Lewis, Washington.

## **Offshore Sulphur Mine is Developed**

Seven miles out in the Gulf of Mexico, Freeport Sulphur Co. is preparing to develop the world's first offshore sulphur mine.

The sulphur deposit to be mined lies approximately 2,000 feet beneath the floor of the Gulf in 50 feet of water. The power plant and other mining facilities will be mounted on a huge platform. Machinery will include three CMA-4 air compressors, rated at 350 bhp., and a Mark TA, 800 KW gas turbine built by Clark Bros. Co., one of the Dresser Industries.

The Clark gas turbine is direct connected to a generator which furnishes power to run the machinery, including the Clark compressors. Waste exhaust gas from the gas turbine is used as pre-heated combustion air for a boiler and will help heat 5,000,000 gallons of water a day at 325° F.

The water heated by the turbine exhaust gas and air from the compressors at a maximum pressure of 1,000 psig. will be used in the Frasch process mining of sulphur. The outer of three concentric pipes carries the hot water to the sulphur deposit; the inner pipe carries the compressed air down into the well, and the intermediate pipe carries the column of molten sulphur which is forced to the surface by the compressed air.

## **"Biblical Floods" To be Prevented**

The fertile valley of the Tigris and Euphrates Rivers in Iraq, believed by some authorities to be the site of the great flood of biblical times survived by Noah's Ark, will soon have a huge dam which will help prevent such floods in the future, it was revealed June 26 in Portland, Ore.

In a paper delivered at a convention session of the American Society of Civil Engineers, Calvin V. Davis, of the Harza Engineering Company, Chicago, said that foundation excavation is now underway for Derbendi Khan Dam on the Diyala-Sirwan River, near Baghdad, which flows into the Tigris.

The primary function of the 443-foot Derbendi Khan Dam will be the storage and regulation of the Diyala-Sirwan River for irrigation use. The greatest value and need for water in Iraq, the author stated, is for agricultural irrigation in the fertile but dry plains of the Tigris and Euphrates valley.

The regulation of the river and the head created by the dam will make feasible the generation of hydroelectric power at Derbendi Khan as a secondary benefit of the project.

Some measure of flood control will be available at the dam, although not without slight reduction in irrigation storage benefits, he said. As presently planned, the flood control is considered of secondary importance.

Above the dam site, the Diyala-Sirwan River has a drainage area of about 6,900 square miles.

The dam project consists of a rockfill storage dam, chute, chute spillway, out-

## **EDWARD'S POLE & WIRE CONST., Inc.**

**Electrical Underground & Overhead**

**GLENVIEW, ILLINOIS**

**Glenview 4-7887**

**Glenview 4-8090**



let works and provisions for a future powerhouse. Selection of a rockfill dam, instead of a concrete gravity dam which also was under consideration, was made mainly because it afforded a saving of \$8,000,000.

In addition to the start of work on the foundation, preparations for diversion of the river also are underway. Diversion of the river will be provided by two tunnels that will serve the permanent outlet works and powerhouse after construction.

When completed, the project will be owned and operated by the Development Board of the Government of Iraq.

## Company Exhibit Features Mural

Combustion Engineering's exhibit at the Second International Atoms for Peace Exhibition, Sept. 1-14, 1958, features a mural presentation of the company's facilities for research, development, design, manufacture and test of complete nuclear reactor systems for stationary and marine power plants. Combustion is a world-wide organization which brings 75 years of experience in burning conventional fuels to the generation of power from nuclear fuels. In keeping with this background one portion of the exhibit will be a scene-in-action display of a typical boiler for a large steam power station.

Illuminated cutaway views will show the 100,000-kw fast-breeder, sodium-cooled reactor for the Enrico Fermi Atomic Power Plant and the 60,000-kw pressurized-water reactor for the Shippingport Atomic Power Station. Other sections of the exhibit will show the manufacturing facilities for core com-

ponents which are produced by the C-E Nuclear Division in Windsor, Connecticut, and for heavy reactor components built by the C-E Nuclear Components Division at Chattanooga, Tennessee.

Combustion has been engaged in a wide range of nuclear activities since 1946 when studies were undertaken to determine the feasibility of power generation from nuclear fuels. Since then the company has served as consultants and designers for the Atomic Energy Commission and electric power companies on reactor system components. It has designed and manufactured reactor vessels, steam generators, shield tanks, rotating plugs and nuclear cores. Notable among the heavy components produced to date are the reactor vessel, end closure and internals for the Shippingport Plant, America's first full-scale nuclear power station; and the reactor vessel, internals and rotating plugs for the Power Reactor Development Company's fast-breeder reactor (Enrico Fermi Plant). To date, Combustion has done more heavy component work than any other company. Work currently in progress includes the fabrication and assembly of five complete reactor cores and a number of reactor vessels and steam generators.

## Wood Preserving

Engineers of bridges, foundations, highway construction, marine wharfs and piers or other structures involving timber may receive a complimentary subscription to *Wood Preserving News*, monthly magazine of the American Wood Preserving Institute. Write on your company letterhead to Wood Preserving News, 111 W. Washington street, Chicago 2, Ill.

## Moon, Mine of Future

If present speculation proves true, the future man in the moon may be a miner, declares *Product Engineering*. The moon may prove to be a vast untapped source of metals and minerals that should be easy to open since there is no covering layer of topsoil.

## MIDWEST ENGINEER Advertisers' Index

Vern E. Alden .....	24
Aldis & Company .....	10
Alvord, Burdick & Howson .....	24
Asplundh Tree Experts .....	31
Batthey & Childs .....	24
John Burns Construction Co. ....	15
Silas Cartland .....	22
Chas. W. Cole & Son .....	24
Combustion Engineering .....	6
Commonwealth Edison Co. ...	Cover IV
Consoer, Townsend & Associates ....	24
Contracting & Material Co. ....	17
DeLeuw, Cather & Co. ....	22
Edward's Pole & Construction Co. ...	30
Federal Pipe & Supply Co. ....	9
Walter H. Flood .....	22
Gilbert-Hodgman, Inc. ....	21
Greeley & Hansen .....	24
E. F. Gritschke & Associates, Inc. ...	22
The Haines Co. ....	25
Hazelet & Erdal .....	24
Henry L. Hoepfner .....	22
Robert W. Hunt Co. ....	22
Jenkins Merchant & Nankivil .....	22
Josam Manufacturing Co. ....	4
Lester B. Knight .....	24
A. A. Lipsey & Associates .....	24
W. H. Lyman Construction Co. ....	8
Robert S. Mayo .....	24
Midwest Forestry Corp. ....	19
Muncie Construction Co. ....	28
Nash Brothers Construction Co. ....	14
National Survey Service .....	24
Fred Nelson of Dayton, Ohio .....	18
Northern Illinois Gas Co. ....	Cover II
John F. Parmer .....	24
Sargent & Lundy .....	22
Sauerman Brothers .....	29
Wm. E. Schweitzer & Co. ....	32
L. J. Sheridan Co. ....	12
Soil Testing Services .....	22
Stanley Engineering Co. ....	24
U. S. Fire Protection	
Engineering Service .....	22
L. L. Weldy & Associates .....	20
Westinghouse .....	11

## ASPLUNDH

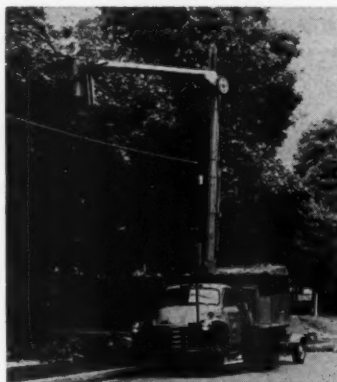
**Effective and Economical  
LINE CLEARANCE  
and Right-of-Way work**

Opening of new rights-of-way, and trimming of trees and chemical brush control on existing rights-of-way are operations which should be entrusted only to specialists.

**412 N. Milwaukee Ave.**

**Wheeling, Illinois**

Attention, Mr. Earl Reynolds



## Obituaries

Word of Member William S. Taussig's passing recently reached Western Society of Engineers. Mr. Taussig was associated with L. D. Schreiber & Co. until the time of his death. He was a Life Member of the American Institute of Electrical Engineers.

Western Society wishes to send condolences to Mr. Taussig's family.

\* \* \*

On May 31 Jacob A. Harman passed away. At the age of 92 Mr. Harman was one of Western Society's oldest members. He became a member of the Society in 1890 and attained Life Member status in 1926.

For many years Mr. Harman was a consulting engineer in the city of Peoria until his retirement from active practice.

\* \* \*

Western Society of Engineers was recently notified of the death of Lester M. Marx, 58. Mr. Marx, a member of Western Society since 1924 served as a commander in the Seabees in the Pacific during World War II. He was a resident of Washington D.C.

Mr. Marx passed away on May 16, 1958. Sincere sympathy is expressed to his family on behalf of Western Society.

## Conference Features Automatic Navigation

An up-to-the-minute report on satellite and space stations and a discussion of automatic navigation will be featured at the 14th annual National Electronics Conference October 13-15 at the Hotel Sherman in Chicago.

In addition, there will be a panel discussion on "The Role of the Laboratory Program in Engineering Education" and a session with five journalists covering "Engineering Writing and Speech."

About 100 scientific papers, given by men from 16 states and three foreign countries, will include such topics as: antennas, audio, communications, computers, engineering management, industrial electronics, instrumentation, amplifiers, microwaves, radar and radio navigation, television and transistors.

A record number of commercial exhibits, highlighted by displays of new electronic developments and devices, is scheduled. There will be social events

and programs for wives of men attending.

NEC, as the nation's leading forum on electronic research, development and application, expects to attract over 10,000 registrants, principally scientists, engineers, educators, manufacturers and government officials.

Sponsors of NEC are: American Institute of Electrical Engineers, Illinois Institute of Technology, the Institute of Radio Engineers, and Illinois and Northwestern Universities. Participants are: Michigan, Michigan State, Notre Dame, Purdue, Wayne State and Wisconsin Universities, Electronic Industries Association and the Society of Motion Picture and Television Engineers.

## Swift Dam to Have "Unusual Features"

Several "unusual features" of the Swift Dam on the Lewis River in Washington make the project so unique that techniques employed may be useful in the construction of similar projects, the American Society of Civil Engineers was told in convention session in Portland, Ore. on June 24.

In a paper covering the construction phases of Swift Dam, Harris H. Burke, of the Bechtel Corporation, San Francisco, said that the science of soil mechanics played an important role in the construction of Swift Dam, which will be, when completed, one of the world's highest earth dams, at 512 feet.

"It is our belief," he said, "that the construction procedures and techniques, which took advantage of the characteristics of the available materials and allowed the full utilization of the science

of soil mechanics, may be useful to others in the construction of similar structures."

The available materials to which he made reference consisted of glacial till and mud of volcanic origin.

Among the unusual features, he reported, was the bold excavation of a deep cutoff trench behind the high cofferdam in the face of possible overtopping by a river in flood. Another was the installation of an unique cellular steel-pile cutoff extending below the bottom of the trench to bedrock, which saved considerable time in the completion of the project.

"Together with the unusual materials available for earth dam construction, coupled with a mild winter and special construction techniques for placing during wet weather, these will allow the completion of Swift Dam in record time.

"This is especially significant considering the weather encountered during the construction period."

In one two-month period, four feet of rain fell while steam shovels, trucks and bulldozers continued to work on the 15,000,000 cubic yards of material required by the huge dam.

When completed, water from the million-acre-foot reservoir created by the dam will pass through turbines to generate 200,000 kilowatts of electricity for the owners, the Pacific Power and Light Company.

## Private Courses

More than 20,000 employed adults enrolled last year in private correspondence courses in engineering, engineering technology, and architecture according to the National Home Study Council.

AMBassador 2-3489

GRenleaf 5-4414

**WM. E. SCHWEITZER & CO.**  
**GENERAL CONTRACTORS**  
**Contractors for Industrial Construction**

2207 Dodge Avenue  
Evanston, Illinois

✓ Check these

6 Reasons why  
**Midwest Engineer**  
is an advertising BARGAIN

- ✓ **Midwest Engineer's** circulation is in America's industrial and residential heart.
- ✓ **Midwest Engineer** is the direct path to specifying, purchasing, and industrial executives — those who say yes.
- ✓ **Midwest Engineer** provides coverage in all engineered industries.
- ✓ **Midwest Engineer** opens a live market area for machinery, fabricated products, industrial equipment, materials of construction, parts, tools, products and services.
- ✓ **Midwest Engineer** is the mirror of the coordination of engineering and civic interests.
- ✓ **Midwest Engineer's** advertising rates are extremely low for coverage of this big market.

**Western Society of Engineers**

84 E. Randolph Street  
Chicago 1, Illinois

# How many of these electric helpers have you added since 1947?....asks LITTLE BILL

☐a ☐b ☐c ☐d ☐e ☐f ☐g ☐h ☐i ☐j









**You're an average family if—** in the postwar years you've added six new electrical appliances. Shown here are a few typical examples.

This is why you're using far more electricity nowadays than you did just a few years ago. And why life is a lot easier. But of all the things you buy today, electricity has gone up *less* than almost anything else.

So, while your bill may be a *little* higher, electricity is actually doing nearly twice as much work for the money now as it did years ago.

**See how little it costs to run each of these electric helpers.**

-  **a—Electric blanket—just 1¢ all night.** Gives warmth of 3 blankets, often weighs less than 1.
-  **b—Portable TV—2 hours for 1¢.** The world's finest entertainment for pennies a day.
-  **c—Air Conditioner—only 2½¢ an hour.** This ¼-ton unit cleans, cools, dehumidifies air in 2 big rooms.
-  **d—Radio—5 hours for 1¢.** Relaxing entertainment for pennies a week.
-  **e—Sun Lamp—healthy tan in a week 1¢.** Like having all the good of the sun all winter.
-  **f—Electric Shaver, 200 shaves 1¢.** Clean, close and comfortable. And it costs so little.

**Other appliances shown include:**

- (g) Hair Dryer—** Does 3 hair sets for 2¢.
- (h) 150-watt lamp—** Good reading light 3 hours for 1¢.
- (i) Electric Wall Heater—** Quick heat to take the chill out of the air—3¢ an hour.
- (j) Electric clock—** the exact time, just 1¢ a week.

*"Electricity costs less today, you know  
than it did 25 years ago!"*

 **Commonwealth Edison**  
AND  
**Public Service Company**





-  
e  
-  
a

g  
-  
w  
a  
e  
c-  
n

pe  
is  
ce  
y

ch

st  
es  
s,  
1.

rs  
n-  
or

-  
ais  
s,  
air

or  
n-  
k.

hy  
ke  
of

00  
se  
nd

de:  
ets  
od  
le.

ick  
the  
ock  
ek.